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DEPART

Physical
Applied Sci.
Sci. Eng.
Engineering

MINING REVIEW

FOR THE

HALF-YEAR ENDED DECEMBER 31st, 1918.



No. 29

DO NOT REMOVE
FROM THIS ROOM

Compiled by LIONEL C. E. GEE, S.M., Chief Registrar and Recorder, Department of Mines.

ISSUED UNDER THE AUTHORITY OF THE

HONORABLE W. H. HARVEY, M.L.C.,

Minister of Mines,

By F. C. WARD, J.P., *Secretary for Mines.*

DEPARTMENT OF GEOLOGICAL SCIENCES,
UNIVERSITY OF TORONTO

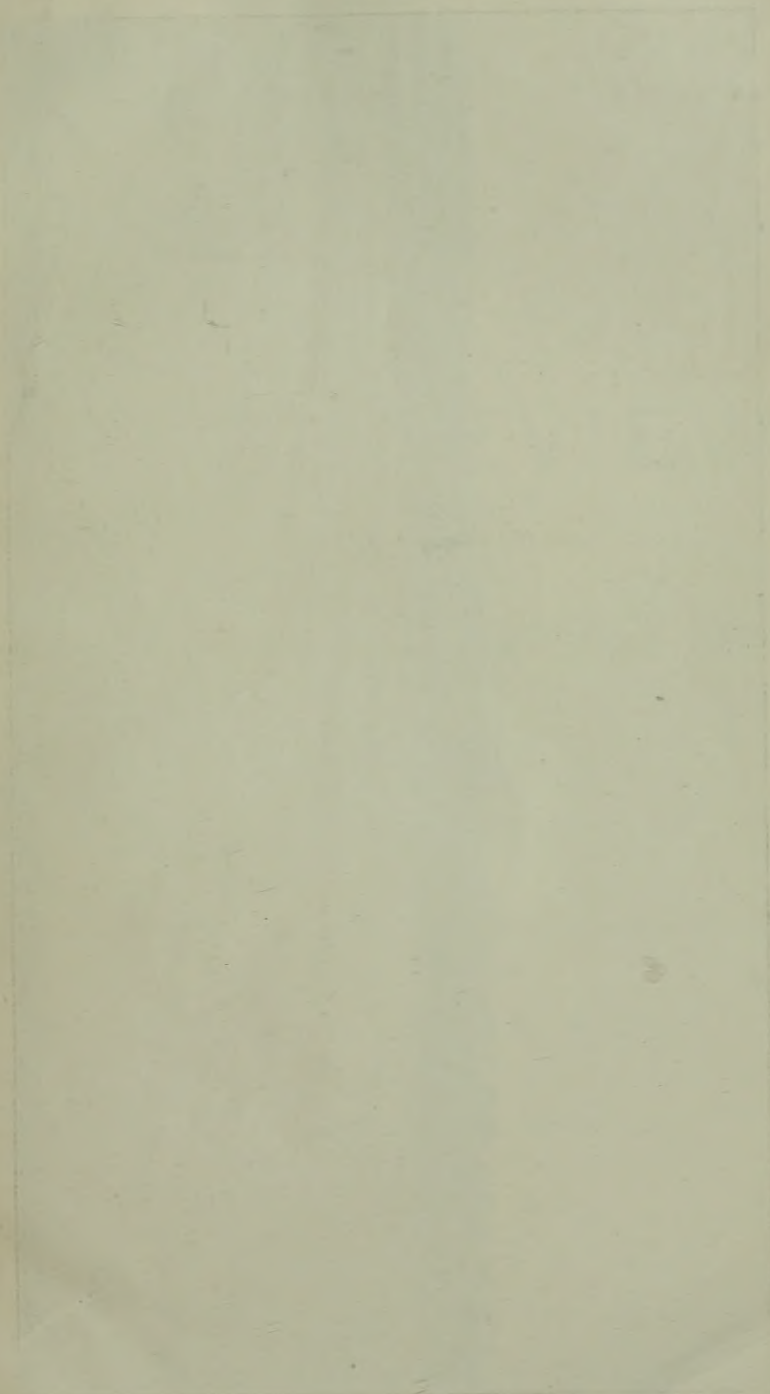
Adelaide :

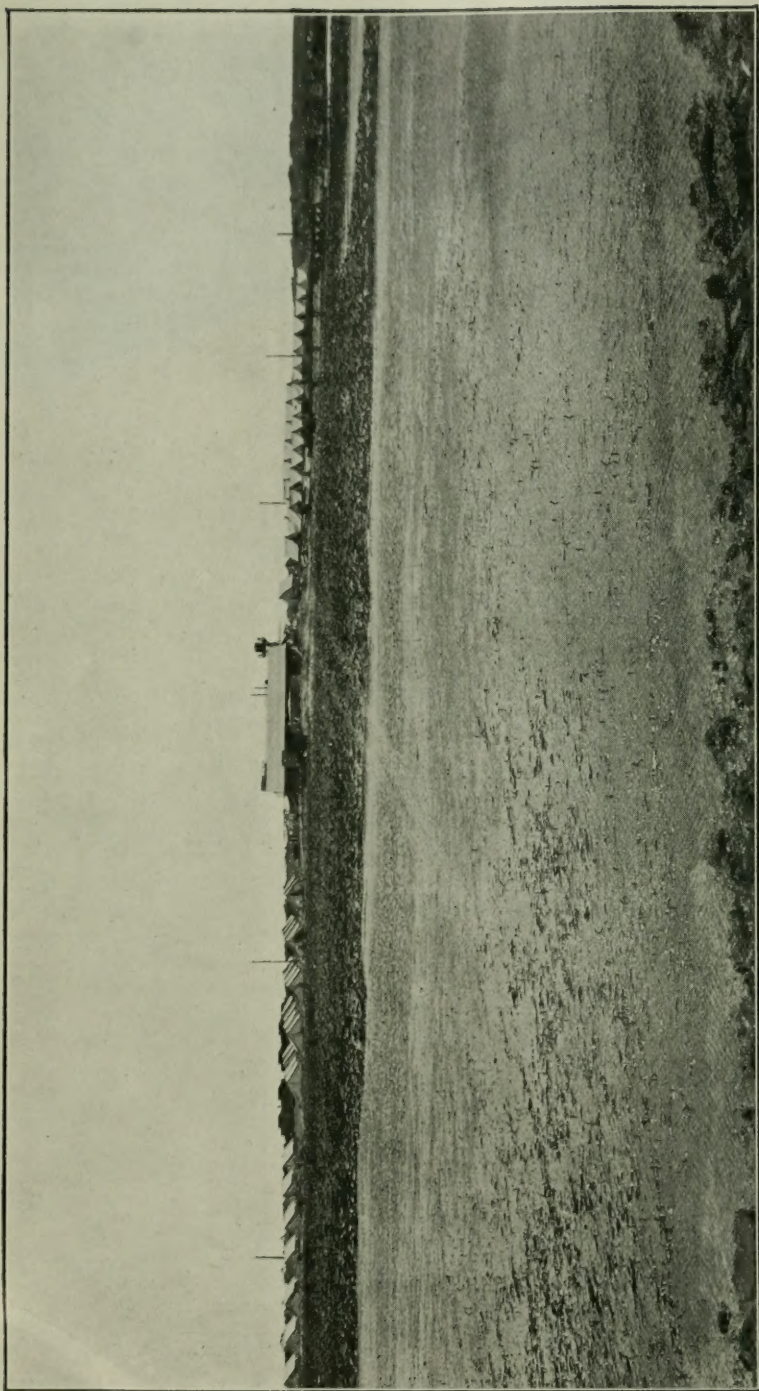
R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1919.



ENGINE STORAGE





WEEROONA. THE RECREATION CAMP OF THE BROKEN HILL ASSOCIATED SMELTERS PROPRIETARY,
NEAR POINT LOWLY, SPENCER'S GULF—FROM THE BEACH.

South



Australia.

DEPARTMENT OF MINES.

MINING REVIEW

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Miners' Rights and Privileges thereunder.

A miner's right is obtainable at the Department of Mines, Adelaide, also at the issuing stations in the various mining districts, at a cost of 5s.; it is in force for one year from the date of issue, and may be renewed at any time during its currency for another term of one year on payment of 5s. The holder is authorised to prospect on any mineral lands for any metal, mineral, coal, or oil, and to peg out (of the prescribed shape and dimensions) gold, precious stones, mineral, coal, and oil claims, and also obtain leases, as detailed below.

AREAS AND WORKING CONDITIONS.

GOLD LEASES—Maximum area, 20 acres; working conditions, one man to every five acres.

MINERAL LEASES—40 acres; one man to every 10 acres.

MISCELLANEOUS LEASES—

Salt 640 acres; special conditions.

Gypsum 640 “ “

Mining Works..... 10 “ one man.

COAL OR OIL LEASES 640 “ one man to every 40 acres.

GOLD DREDGING LEASES 200 “ special conditions.

MINERAL CLAIMS 40 “

GOLD CLAIMS..... 30ft. x 30ft., alluvial; 100ft. x 600ft., reef.

PRECIOUS STONES CLAIMS 150ft. x 150ft.

Gold and Precious Stones claims must be constantly worked—one man for each claim—and mineral claimholders must employ two men for each claim. Amalgamation of either gold (reef), or mineral claims reduces the labor conditions by one-half until payable results have been obtained.

Gold, mineral, coal, and oil leases are granted for a term not exceeding 21 years—the two former at a rental of 1s. per acre per annum and a royalty of 6d. in the pound on net profits, the latter at a rental of 6d. per acre per annum until coal or oil is found in payable quantities, when 1s. per acre is payable and a royalty of 6d. in the pound on the net profits.

The Minister may permit, for the concentration of labor, of the amalgamation of not more than four adjoining gold or mineral leases.

Any number of gold (reef), mineral, coal, or oil leases may be held by one person.

Licences to search for twelve months for precious stones, mineral phosphates, oil, rare metals, minerals, and earths are issued on specific mineral lands, not exceeding five square miles in area for one person, a fee of 20s. being charged for each square mile or portion thereof. The licences for mineral phosphates, oil and rare metals, minerals and earths give a preferential right to a lease over a portion of the area, as prescribed, and in case of a licence to search for precious stones, to a precious stones claim not exceeding the prescribed area.

MINING ON PRIVATE PROPERTY.

The Mining on Private Property Act of 1909 and the amending Act of 1916 apply only to land, the metals, minerals, precious stones, metalliferous ores, coal, shale, oil, salt, or gypsum on or under which are alienated from the Crown in fee simple.

Prior to 1886 all metals, minerals, &c., were sold with the land (these lands are defined as "Private land" in the Acts), but since 1886 gold, and since 1888 all the metals and minerals in lands sold by the Government are reserved to the Crown and can be dealt with under the Mining Act of 1893.

All arrangements for entry and for mining on private land can be made, if feasible, between the prospector and the owner of the freehold without reference to the Mining on Private Property Acts, *save that a copy of any agreement made must be forwarded without delay to the Mines Office, and six monthly returns giving full details of the mining operations must be furnished.*

The procedure necessary under the Acts is now according to the following summary:—

- (1) The prospector will obtain a miner's right.
- (2) He will apply for a written authority to enter and peg out from the Minister, or a warden, or mining registrar; to obtain which it is necessary for him to lodge at the Mines Office a statutory declaration made before a Justice to the effect that there are reasonable grounds, which must be shortly stated, for supposing the land to be mineral bearing; also a plan showing the land referred to, and a deposit of a sum of money as security against any possible damage done by him during the fourteen (14) days allowed for preliminary prospecting. In connection with the deposit required, the amount should, if possible, be arranged between the applicant and the owner of the land; but if at the expiration of seven (7) days after an application in this behalf has been made by the applicant to the owner, the amount cannot be agreed upon, the amount of the deposit will be assessed by the department.
- (3) On receiving the authority, before actually entering upon the private land, three (3) clear days' notice in writing must be given to the owner and occupier.
- (4) The authority entitles the prospector to prospect between the hours of 6 a.m. and 6 p.m. for a period not exceeding fourteen (14) days on an area not exceeding one square mile; also to make trenches and sink holes, provided that the area of the surface broken by such operations does not exceed 100 square feet. The prospector may also remove samples not exceeding 28lbs. in weight.
- (5) If he is satisfied he may peg out the area which he desires to have included in a claim or lease.
- (6) The prospector then endeavors to make a private arrangement with the owner of the property for the working of the mineral deposit.
- (7) If, after the expiry of one month, he fails to arrive at a satisfactory agreement with the owner, he can apply for a compulsory mining lease.
- (8) On the granting of such lease the work of mining or actually raising ore for sale can be commenced.

The right formerly possessed by the owner of the land to work the property himself within a period of two months by complying with the necessary working conditions no longer exists.

NOTES FOR OPAL MINERS.

Every miner must have a miner's right. The fee is 5s. per annum, and they are obtainable at the Adelaide Mines Office, Tarcoola, Port Augusta, Beltana, Hergott (Marree), and Oodnadatta Police Stations, and from Mr. J. W. Duck, Leigh Creek (Copley).

A miner's right may be issued to any "person"—that is, any individual above the age of 16 years. This right forms the basis of all operations under the Mining Acts. Without it a person has no protection, cannot legally prospect or mine, or peg out a claim, and, moreover, is liable to a penalty of £1 per day for unlawfully prospecting and mining.

The holder is authorised to prospect for any metal, mineral, precious stones, coal, or oil, the property of the Crown, with the right of possession when found. It is the authority for pegging out a claim and also to occupy for residence a quarter of an acre of land, from which the holder has the right to remove any buildings erected by him, and he may cut and use timber from Crown lands for his own mining and domestic purposes. Each claim must be represented by a miner's right, and it must be noted that no person can hold more than *one* precious stones claim at the same time.

The area allowed for a precious stones claim is 150ft. by 150ft., and is to be pegged out in the following way:—Four pegs are to be securely placed in the ground to mark the four corners. Each peg must be not less than 3in. thick and project not less than 3ft. above the surface of the ground, and have clearly marked on it the number of the miner's right and the date of pegging. From each peg two trenches must be cut in the ground not less than 3ft. long, 1ft. wide, and 6in. deep, pointing in the directions of the boundary lines of which the peg forms the corner. In rocky ground stone direction piles may be made instead of the trenches. All these marks must be maintained in position while the claim is held, or the claim will be liable to forfeiture. When pegging out ground adjoining another claim a wall 3ft. wide must be left between the claims. The working conditions are one man to be kept constantly employed for each precious stones claim. Constantly employed means eight hours for five working days of the week and four hours for Saturday. Claims can be held for 30 days without registration, and under exceptional circumstances this period may be extended for a further 14 days. The registration must be made at the Adelaide Office, and the form of application is simple and readily obtainable. It must show name and address of applicant, number of miner's right, nature of claim, locality, and sketch showing position. The miner's right must be attached to the application and a fee of 2s. 6d. paid. The certificate of registration is then issued from the Adelaide Office, and the miner's right returned to the applicant with the registered number marked thereon. Care must be taken that the miner's right, by virtue of which the claim is held, is kept valid by renewal at the proper time and not allowed to lapse, otherwise the certificate will become void and the title to the ground lapses.

Every holder of a claim is protected—

- (a) While he is incapacitated from work by illness;
- (b) Absent on urgent business;
- (c) In attendance at a court of law;
- (d) During the continuance of floods or droughts;
- (e) While he is engaged upon work in public or national interest;
- (f) During public holidays; and
- (g) During 14 days commencing on the 22nd December, and in mines that are over one day's railway journey from Adelaide the Christmas exemption may extend for one month from December 15th, under the Minister's authority.

The onus of proof of good cause for absence lies on the claimholder. Notices should be placed on the claim and also forwarded to the Adelaide office.

PREFACE.

THE value of the total mineral production for the year 1918, so far as can be ascertained, was £1,451,438. This total will be seen to compare favourably with that of the previous year, which reached £1,460,674, when it is noticed that the value of the yearly output in the case of the two principal metals—copper and iron—was lower during 1918. The contribution of some of the non-metallic mineral products such as barytes, gypsum, limestone, flint pebbles, salt and opal, was considerably greater than in the previous year, and the output of manganese ore was also materially larger. The details of production during the last ten years are set out in the table on pages 8 and 9.

Consequent upon the passing of the Mining Act Further Amendment Act of 1918, No. 1352 of 1918, provision has been made for variations in the working conditions of precious stones claims, special mineral claims and mineral leases. A special summary of the new regulations governing the precious stones claims has been prepared by the Chief Registrar of Mines and appears on the preceding page.

The Chief Registrar has also prepared an account of the welfare work carried out by the Broken Hill Associated Smelters Proprietary Ltd. at Port Pirie and Weeroona, as a result of personal investigations, in order that a statement of the facts may be available for the general information of the mining public and those who are interested in welfare and betterment work.

L. KEITH WARD,

Director of Mines.

March 27th, 1919.

PREFACE.

The value of the total mineral production for the year 1918, as far as can be ascertained, was \$1,451,432. This total will be seen to compare favorably with that of the previous year, which reached \$1,400,000, when it is noted that the value of the yearly output in the case of the two principal metals—copper and iron—was lower during 1918. The contribution to some of the non-metallic mineral products such as potash, gypsum, limestone, salt, and opal, was considerably greater than in the previous year, and the output of manganese ore was also materially larger. The details of production during the last two years are set out in the table on pages 2 and 3.

Consequent upon the passing of the Mining Act Further Amendment Act of 1918, No. 1351 of 1918, provision has been made for variations in the working conditions of persons employed in the mining industry and related trades. A special summary of the new regulations governing the persons employed in the mining industry has been prepared by the Chief Registrar of Mines and appears on the preceding page.

The Chief Registrar has also prepared an account of the welfare work carried out by the Broken Hill Associated Miners' Protective Fund at Port Pirie and Westport, as a result of personal investigations in order that a statement of the facts may be available for the general information of the mining public and those who are interested in welfare and betterment work.

I. KENNEDY WARD,

Director of Mines.

March 25th, 1919.

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DECENNIAL RETURN SHOWING, SO FAR AS CAN BE ASCERTAINED
PRODUCED IN

	1909.		1910.		1911.		1912.		1913.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	ozs.	£	ozs.	£	ozs.	£	ozs.	£	ozs.	£
Gold	7,111	30,206	6,603	28,000	3,537	15,000	6,592	28,000	6,556	27,800
Silver	1,660	167	6,250	625	1,400	140	2,700	326	2,650	300
Silver Lead Ore	Tons 70	416	Tons 25	22	—	—	—	—	Tons 153	1,100
Copper	113,940 cwts.	334,584	102,040 cwts.	306,120	118,440 cwts.	332,500	125,900 cwts.	461,500	143,222 cwts.	488,986
Copper Ore and Regulus	Tons 1,230	4,003	—	—	—	—	—	—	—	—
Lead	140 cwts.	00	400 Tons	260	—	—	—	—	—	—
Ironstone	Tons 16,120	8,296	Tons 46,200	21,945	Tons 42,300	26,400	Tons 42,200	26,375	Tons 60,656	37,911
Manganese Ore	—	—	—	—	—	—	—	—	—	—
Molybdenite	—	—	—	—	—	—	—	—	—	—
Wolfram Ore	—	—	—	—	40 cwts.	154	5 cwts.	20	22 cwts.	10
Radium and Radio Active Material (Ura- nium Ore)	—	—	—	—	—	—	—	—	—	3,620
Asbestos	—	—	—	—	—	—	—	—	—	—
Alunite	—	—	—	—	—	—	—	—	—	—
Barytes	—	—	60	180	—	—	—	—	Tons 103	320
Bluestone	—	—	299	5,980	Tons 181	4,163	Tons 102	2,550	13	325
Chalk (Talc)	—	—	40	100	100	200	120	600	50	250
Fireclay and Pipeclay	—	—	922	188	1,463	169	200	150	320	240
Gypsum	—	—	15,800	9,000	9,700	7,275	12,000	9,000	7,150	5,362
Kaolin	—	—	—	—	—	—	—	—	—	—
Limestone	13,765	2,464	18,600	3,720	28,700	7,175	50,600	12,500	44,300	11,075
Magnesite	—	—	—	—	—	—	—	—	—	—
Mica	—	—	—	—	—	—	—	—	—	—
Ochre (crude)	—	—	180	746	105	105	300	300	250	250
Opal	—	—	—	—	—	—	—	—	—	—
Pebbles, Flint	—	—	—	—	458	856	120	420	514	1,799
Phosphate Rock	3,772	3,697	5,200	5,200	5,800	5,800	6,100	6,100	5,950	6,545
Pyrites	—	—	2,920	3,270	2,496	2,560	—	—	—	—
Salt (crude)	51,407	25,594	54,000	27,000	65,000	40,600	64,300	40,187	65,000	48,750
Sulphuric Acid	—	—	4,758	3,370	4,626	6,940	5,095	7,642	5,602	7,983
Soapstone	—	—	90	116	—	—	—	—	—	—
Unenumerated	—	3,873	—	—	—	—	—	—	—	—
£	—	413,390	—	415,842	—	450,037	—	595,670	—	642,626

OUTPUT AND VALUE OF THE VARIOUS METALS AND MINERALS SOUTH AUSTRALIA.

1914.		1915.		1916.		1917.		1918.		1909-1918.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Total Output.	Total Value.
ozs.	£	ozs.	£	ozs.	£	ozs.	£	ozs.	£	ozs.	£
6,258	26,581	6,081	25,830	7,769	33,000	7,145	30,334	6,189	26,252	63,841	271,003
3,006	314	2,462	277	3,427	514	1,825	333	1,608	331	26,988	3,327
Tons		Tons		Tons		Tons		Tons		Tons	
18	215	59	625	243	4,659	622	12,018	503	10,161	1,693	29,216
cwts		cwts.		cwts.		cwts.		cwts.		cwts.	
137,614	417,487	154,506	561,247	145,580	822,527	144,262	902,495	143,378	828,556	1,328,682	5,456,002
—	—	—	—	—	—	—	—	—	—	Tons	
—	—	—	—	—	—	—	—	—	—	1,230	4,003
—	—	—	—	—	—	—	—	—	—	27	350
Tons		Tons		Tons		Tons		Tons		1,261,219	1,260,060
42,622	37,137	237,375	264,612	188,329	200,382	328,386	359,723	257,029	277,279	2,138	22,736
—	—	250	563	544	2,700	264	1,597	1,080	17,876	T. c.	
—	—	—	—	—	—	cwts.		cwts.		1 3	457
cwts.		cwts.		cwts.		18½	359	4½	98	cwts.	
6	24	5	35	4	28	4	30	—	—	66½	301
—	5,215	—	—	—	—	—	—	—	686	—	9,521
—	—	7	5	Tons.		—	—	—	—	T. c.	
—	—	—	—	21	210	—	—	—	—	21 7	215
Tons		—	—	134	670	Tons		—	—	Tons	
20	40	—	—	—	—	29	145	—	—	183	855
560	1,680	Tons		456	2,052	790	2,370	Tons		3,611	11,981
—	—	290	1,320	—	—	—	—	1,352	4,059	598	13,087
—	—	5	69	—	—	—	—	—	—	648	1,912
—	—	—	—	103	309	—	—	235	453	—	—
1,223	917	7,165	5,374	1,605	1,204	1,874	1,405	1,501	710	16,273	10,357
16,276	12,207	19,900	17,413	20,371	17,825	12,776	11,179	32,013	28,012	145,986	117,273
10,239	16,382	1,209	1,934	1,635	2,616	1,967	3,442	2,513	4,888	17,563	29,262
54,054	16,892	71,723	22,413	74,641	23,325	68,464	21,395	72,209	34,813	497,056	155,772
—	—	80	160	166	332	150	300	440	666	836	1,458
—	—	—	—	—	—	37½	337	—	—	37½	337
84	84	28	28	40	80	78	156	30	60	1,095	1,809
—	—	—	—	—	750	—	500	—	7,175	—	8,425
270	829	385	1,023	158	474	1,217	3,956	2,816	11,849	5,938	21,206
6,083	6,691	4,614	5,536	5,013	5,839	5,101	6,064	8,074	10,773	55,707	62,245
—	—	—	—	—	—	—	—	—	—	5,416	5,830
65,000	48,750	64,000	80,000	66,400	83,000	46,858	93,716	88,519	177,038	630,484	664,635
5,940	8,910	5,965	13,421	6,919	10,378	6,190	8,820	6,746	9,613	51,841	77,077
—	—	—	—	—	—	—	—	75	150	165	266
—	—	—	—	—	—	—	—	—	—	—	3,873
—	600,355	—	1,001,885	—	1,212,874	—	1,460,674	—	1,451,498	—	8,244,851

Mining Operations during the Half-year ended December 31st, 1918.

AREA AT PRESENT HELD UNDER MINING ACTS (DECEMBER 31st, 1918).

Nature of Holding.	Number.	Area.
Mineral leases	333	15,092 acres
Gold leases	66	1,240 "
Miscellaneous leases	71	17,927 "
Coal and oil leases	4	1,360 "
Mineral claims	443	15,118 "
Occupation licences	206	103 "
Search licences	59	114,560 "
Coal and oil claims	9	5,760 "
Gold claims	3	10 "
Total holdings	1,194	171,170 acres

REGISTERED FROM JULY 1st, 1918, TO DECEMBER 31st, 1918.

Miscellaneous leases	7	3,340 acres
Mineral leases	61	2,440 "
Gold leases	2	37 "
Mineral claims	153	5,958 "
Coal and oil claims	1	640 "
Occupation licences	3	1½ "
Search licences	29	46,720 "
Miners' rights	816	—
Total	1,072	59,136½ acres

MEN EMPLOYED.

Estimated number of men employed in mining and mineral works, December 31st, 1918 :—

Copper	2,000
Gold	100
Salt and Gypsum	400
Other minerals	250
Smelting works, etc.	2,600
Total	5,350

GENERAL NOTES.

Reports, as under, will be found—

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The average price of copper in London during the six months has been—

	£	s.	d.
Standard	120	18	0
Best selected	131	10	1
Electrolytic	133	11	8

The average market prices for standard copper per ton during the war were—

	£	s.	d.
Six months ended—December 31st, 1914	56	16	10
June 30th, 1915	71	1	1
December 31st, 1915	74	4	4
June 30th, 1916	111	14	7
December 31st, 1916	120	8	0
June 30th, 1917	133	12	5
December 31st, 1917	116	12	3
June 30th, 1918	110	5	0
December 31st, 1918	120	18	0

The average for the year 1918 is £115 11s. 6d., and for the 10 years—1909-1918—£80 6s. 6d.

At the *Wallaroo and Moonta Mines* 103,614 tons of stone have been raised, and 96,545 tons treated, carrying from 2·3 to 3·03 per cent. copper.

A discovery of rich copper ore has been made recently at the *Dome Rock*, near Boolcoomatta Station, to the north of the Broken Hill railway line. A report on the property by the Chief Inspector of Mines will be found at page 45.

At the *Mount Gunson Copper Mine* the work in progress consisted of breaking and picking ore; about 450 tons of crude ore were raised, which were reduced to 220 tons of about 8 per cent. ore and dispatched to the smelters at Cockle Creek.

From Yudnamutana, 59 tons of copper ore from the *Dominick, Yuda, and Noll Mines* were marketed.

Some work has been done at the old *Poona Mine*. A new shaft was sunk to 60ft., and at 40ft. a crosscut was started to intersect the lode; 13 tons of 7·5 per cent. ore were sent to the smelting works.

More or less copper mining has been in progress at the following Mines:—Kapunda, Hamilton, Nichol's Nob, Paull's, Barilla, Mount Fitton South, Warra Warra, Diamond Jubilee, Mount Burr, War Loan, Last Chance, Red Boulder, Breaden Hill (near Mundowdna), Green Rock, Big Lode, Poonana, Beltana, Blinman, Black Eagle, Warrioota, and Sweet Nell.

In September all operations at the *Kitticoola Mine* were discontinued.

The *Deloraine Gold Mines Co.* has declared a third dividend of 1s. per share. During the six months 2,728 tons of ore were treated for 1,390ozs. of gold bullion valued at £5,307 14s., and 1 ton 7cwts. of copper valued £137 0s. 9d., total £5,444 14s. 9d. The manager furnishes the following summary of the operations for the six months:—

At the 192ft. Level the South Drive has been extended 10ft., total distance from main shaft 550ft. This drive shows only small seams of quartz, all low grade.

292ft. Level.—Intermediate South Drive advanced 34ft., total 116ft. The reef followed contains a value of 45s. per ton over a width of 30in.

The Intermediate Stopes, North and South, have been worked continuously during the period under review and have varied from 20 to 56in. in width with values from 38 to 85 shillings per ton.

No. 3 Rise (Hanging Wall Lode) has been put up 33ft. on a small reef containing an average value of 42s. per ton.

Footwall Lode.—No. 1 winze has been started at a point 245ft. south of main shaft and sunk 25ft. The reef followed has averaged 28in. in width, value 62s. per ton.

Plant.—No alterations or additions have been made to the machinery during the half-year, all of which is in good working order.

A five head battery has been erected at the *Wheal Murray Mine, Forest Range*, but after running for a short time work had to be suspended on account of the shortage of water, *vide* page 57 for report by the Inspector of Mines.

At the *Dustholes Mines*, near Mt. Grainger, operations have been much delayed owing to the want of water, but prospecting has been carried on during the six months and also the erection of the plant. A full report on this property was made by the Chief Inspector of Mines in August last and was published in Review No. 28.

Two parcels of stone from *Fabian's No. 3* were treated for the *New Glenloth Gold Mine Syndicate*. The first, 41 tons, gave 6ozs. 0dwts. 1gr. gold bullion valued at £22 17s. 8d.; the second, 9 tons 13cwts., yielded 14ozs. 18dwts. 20grs. valued at £48 17s. 7d. A detail report on the mine will be found at page 48.

Reports from the *Mt. Malvern Silver Lead Mine* show 1,300 tons treated for 124 tons of concentrates containing 55 per cent. lead and 15ozs. silver per ton. The work done consisted of opening up new stopes, east and west, sinking winzes at the 300 and 400ft. levels, driving and stoping at the 400ft. level, and overhauling plant and machinery.

For report on the *Olivaster Silver Lead Mine* by the Chief Inspector of Mines, *vide* page 43.

Attention is called to the report of the *Leigh Creek Coal Committee*, page 31. Some of the coal raised was used by firms in Adelaide and by one of the mines in Broken Hill during periods of stress and in some cases prevented the cessation of operations. A large number of experiments have been carried out and other tests will be made in the future.

The two important discoveries of *Alunite*, made on the western shore of Gulf St. Vincent (*vide* Review No. 28), are being actively prospected and seem likely to afford a more reliable supply of this mineral than any other Australian deposit yet known. The material is of good grade and the probable tonnage to be developed is sufficient to justify the establishment of a plant to deal with this useful material with the object of supplying Australian demands for potash.

Manganese deposits are being actively worked at *Pernatty, Hawker, and Gordon*. The steel industry in New South Wales will create a market for manganese ore which may be supplied from South Australian sources. Some high-grade ore has been exported to Great Britain and America for the manufacture of war munitions.

The time limit of the standing offer of a bonus for the local production of *Graphite* has been extended from June 30th, 1919, to June 30th, 1922, *vide* page 16.

The prospecting operations in one of the graphite deposits of Eyre's Peninsula have provided highly encouraging results and steps are being taken to further develop the property with the ultimate object of erecting a treatment plant. The State has afforded material assistance towards this branch of the industry by carrying out concentration tests and in other ways also.

The demand for *Barytes* for the manufacture of white pigments has resulted in the shipment of a number of parcels from various parts of the State to the eastern States, and mainly owing to the facilities granted under the Amending Private Property Act, several new mines from which high-grade barytes is being won have been opened up in the Hills district.

The State's resources of *Gypsum* are being more fully recognised. Plaster of Paris is being manufactured and exported from holdings in Southern Yorke Peninsula and from Port Adelaide. Areas are being taken up in fresh localities for the purpose of satisfying the Australasian demand for gypsum.

The Australasian demand for salt has led to an increase in the area under lease, and the amount of salt obtained during 1918 constitutes a record.

There has been considerable Inter-State enquiry after salt and gypsum deposits.

Considering the droughty conditions prevailing in the district the *Stuart's Range Opal Field* has made steady progress. Many enquiries have been made concerning the place by returned soldiers and others, and on the news arriving that some rain had fallen several parties started for the field.

The main waterhole has been reserved. A Government boring plant is on the field, and the Government is endeavoring to render the occupation of the field permanent by drilling a deep hole in search of water.

A systematic examination of the *phosphate deposits* of the State has been in progress for several months, and much still remains to be done. It has been found, in the course of this work, that there are large deposits of relatively low-grade lime phosphate and of aluminium phosphate which are not now being utilised. With the co-operation of the Department of Agriculture arrangements have been made to carry out a lengthy series of field tests on the finely-ground raw phosphate rock.

DEPARTMENT OF MINES.

"THE NATIVE INDUSTRIES ENCOURAGEMENT ACT, 1872."

NOTICE OF THE OFFER OF A BONUS FOR THE DISCOVERY OF OIL.

Adelaide, December 19th, 1918.

A bonus of £5,000 is offered to the person or body corporate which first obtains from a bore or well situated in the State of South Australia 100,000galls. of crude petroleum, containing not less than 90 per cent. of products obtainable by distillation.

No application for a bonus will be considered unless the following conditions have been strictly complied with:—

1. The applicant for the bonus must have furnished to the Minister of Mines, during the progress of drilling operations—

- (a) A monthly record of work done ;
- (b) A full log of all bores and wells sunk, whether successful or unsuccessful ;
- (c) Samples of materials passed through by the bores, to be taken at every 50ft. sunk, and also at every change of country encountered ;
- (d) A declaration pursuant to "The Statutory Declarations Act, 1835," of the exact locality of each bore or well. (This should be furnished with the first monthly report on the bore or well.)

2. The oil must have been stored at the bore or well from which it has been obtained until the whole 100,000galls. has accumulated.

3. The applicant must furnish with his application—

- (a) The certificate of a licensed surveyor nominated by the Minister of Mines as to the quantity of oil so stored ;
- (b) The certificate of the Government Analyst of the result of his analysis of samples of the oil taken by a person nominated by the Minister of Mines ;
- (c) A declaration pursuant to "The Statutory Declarations Act, 1835," that the whole of the oil for which the bonus is claimed was obtained from the bore or well where it is stored.

4. Within 24 hours of the first discovery of oil in the well or bore, notice of such discovery must be sent to the Minister of Mines.

5. Any person who desires at any time to inspect or test the well or bore on behalf of the Minister of Mines must be granted every facility for this purpose.

6. The applicant must have done nothing contrary to the provisions of "The Mining Act, 1893," or "The Mining Act Amendment Act, 1900," or of any lease or licence granted to the applicant under either of these Acts.

W. H. HARVEY, Minister of Mines.

DEPARTMENT OF MINES.

"THE NATIVE INDUSTRIES ENCOURAGEMENT ACT, 1872."

NOTICE OF THE OFFER OF A BONUS FOR THE PRODUCTION OF GRAPHITE.

Office of the Minister for Mines, Adelaide, March 13th, 1919.

It is hereby notified that, pursuant to the powers conferred by the Act No. 30 of 1872, and of all other powers in that behalf, a bonus will be paid by the Government, on the conditions hereinafter stated, to persons who actually recover and sell graphite in the market. The bonus and the conditions will be as follows:—

1. A bonus of one pound (£1) per ton on marketable graphite will be paid to any person or body corporate producing such graphite from a mine in South Australia.

2. Such bonus will be paid on the production, to the approval of the Minister of Mines, of account sales of graphite sold prior to the 30th day of June, 1922.

3. Every applicant for the payment of a bonus shall lodge with the said Minister a declaration, made pursuant to the Statutory Declarations Act, 1915, that the whole of the graphite for which such bonus is claimed was produced in South Australia, and stating the exact locality where the same was obtained.

W. H. HARVEY, Minister of Mines.

CRUSHING AND CYANIDING PLANTS.

RETURNS FROM GOVERNMENT CRUSHING AND CYANIDING PLANTS FOR THE HALF-YEAR ENDED DECEMBER 31st, 1918.

Name of Mine.	Locality.	Weight of Ore.	Gold Bullion Recovered.	Total Value of Bullion.	Yield per Ton, in Shillings.
		Tons cwt. qrs.	Ozs. dwts. grs.	£ s. d.	s.
TARCOOLA BATTERY AND CYANIDE WORKS.					
Tarcoola Perseverance	Tarcoola	37 10 0	45 2 4	162 14 11	87
Hidden Treasure	"	13 10 0	4 16 21	15 7 2	23
Royal George	3 miles west of Tarcoola	25 0 0	14 8 22	50 18 4	40
Tarcoola Perseverance	Tarcoola	25 0 0	18 12 7	63 8 10	51
Total		101 0 0	83 0 6	292 9 3	58
Grand total since starting of battery ..		8,637 5 3	11,277 19 13	39,752 14 9	92

PETERBOROUGH BATTERY AND CYANIDE WORKS.

Lady Edith	Peterborough	4 15 0	0 11 12	1 17 1	8
Homeward Bound ..	Mannahill	5 8 0	18 8 19	71 13 4	265
" ..	"	4 0 0	2 9 12	9 13 7	48
" ..	"	5 3 0	5 17 16	22 11 3	87
" ..	"	4 5 0	6 16 7	26 2 1	122
Total		23 11 0	34 3 18	131 13 4	112
Grand total since starting of battery ..		5,304 17 0	4,830 18 3	17,962 16 1	68

GLENLOTH BATTERY AND CYANIDE WORKS.

Fabians No. 3	Glenloth	41 0 0	6 0 1	22 17 8	11
"	"	9 13 0	14 18 20	48 17 7	101
Total		50 13 0	20 18 21	71 15 3	28
Grand total since starting of battery ..		3,323 12 0	2,504 19 22	8,413 9 4	50

MOUNT TORRENS BATTERY AND CYANIDE WORKS.

Grand total since starting of battery ..	11,291 1 3	6,767 6 15	25,463 6 9	45
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RETURNS FROM CRUSHING AND CYANIDING PLANTS (OTHER THAN GOVERNMENT) FOR THE HALF-YEAR ENDED DECEMBER 31st, 1918.

Name.	Ore Treated.	Gold Bullion Recovered.	Value.	Yield per Ton, in Shillings.
	Tons cwt. qrs.	Ozs. dwts. grs.	£ s. d.	s.
DELORAINÉ GOLD MINE.				
Delorainé	2,728 0 0	1,390 0 0	5,307 14 0	—
*Total	2,728 0 0	1,390 0 0	5,307 14 0	39

* Also 1 ton 7 cwt. copper, worth £137 0s. 9d.

KITTICOOLOA, REEDY CREEK.

Battery treatment	95 0 0	28 14 0	103 13 1	—
Total	95 0 0	28 14 0	103 13 1	22

TOTAL BATTERY AND CYANIDE RETURNS FROM ALL PLANTS FOR SIX MONTHS ENDED DECEMBER 31st, 1918.

Name.	Ore Treated.	Gold Bullion Recovered.	Value.	Yield per Ton, in Shillings.
	Tons. cwt. qrs.	Ozs. dwts. grs.	£ s. d.	s.
Peterborough	23 11 0	34 3 18	131 17 4	112
Tarcoola	101 0 0	83 0 6	292 9 3	58
Glenloth	50 13 0	20 18 21	71 15 3	28
Delorainé	2,728 0 0	1,390 0 0	5,307 14 0	39
Kitticooloa	95 0 0	28 14 0	103 13 1	22
Total	2,998 4 0	1,556 16 21	5,907 8 11	39

**SUMMARY SHOWING TOTAL ORE TREATED AT STATE BATTERIES
AND CYANIDE WORKS TO DECEMBER 31st, 1918, FROM MINES
HEREUNDER.**

Name of Mine.	Locality.	Weight of Ore.	Gold Bullion Recovered.			Total Value of Bullion.	Yield per Ton, in Shillings.
		Tons. cwt. qrs.	Ozs. dwts. grs.	£	s.	d.	s.
Associated	Tarcoola	50 13 0	43 6 5	152	18	3	60
Ajax	Waukaringa ..	125 10 0	89 3 7	347	19	9	55
Angepena Treasure ..	Mount Serle ..	4 7 0	17 10 3	69	7	5	318
Block 245	Wadnamanga {	4 16 0	9 16 10	33	18	8	141
Block 249		4 13 0	4 15 12	17	8	10	74
Bohun	Tarcoola	93 15 0	27 16 23	99	14	0	21
Barossa Cement	Barossa	98 10 0	28 9 3	114	16	6	23
Banksia	Woodside	219 17 2	180 13 7	698	11	6	63
Blumberg	Birdwood	699 12 0	600 7 22	2,257	8	4	64
Blumberg Proprietary	Birdwood	481 2 0	213 6 4	769	17	4	32
Brind	Woodside	127 16 3	44 18 4	153	0	8	23
Bird-in-Hand	Woodside	154 11 0	48 6 2	248	5	2	32
Boomerang	Outalpa	80 15 0	69 12 16	227	19	6	56
Blunsdens	Peterborough ..	39 19 0	3 0 19	9	14	0	4
Brilliant	Macaw Creek ..	9 2 0	8 15 8	29	5	10	64
Crane's Reef	Birdwood	120 12 0	41 2 10	152	7	11	25
Curdnatta	Tarcoola	777 1 0	943 3 6	3,472	4	6	89
Cobra	Birdwood	7 3 0	1 15 4	5	6	0	14
Crown	Birdwood	264 1 3	130 7 22	466	8	0	35
Copperlinka	Olary	165 3 0	111 3 0	419	3	6	50
Day Dawn	Tarcoola	983 13 0	1,546 14 19	5,172	13	7	105
Dark Hill	Near Tarcoola ..	25 10 0	6 3 17	20	15	9	16
Duchess Neindorf ..	Tweedvale	52 4 0	54 5 4	198	0	8	75
Deloraine	Kersbrook	482 12 2	569 16 23	2,116	18	8	87
Dart's Syndicate	Mt. Torrens	64 14 0	19 0 0	74	0	0	22
Durdan	Birdwood	217 16 2	83 16 12	316	10	4	29
Diamond Jubilee	Silverton, N.S.W.	12 6 0	4 7 7	13	5	10	21
Dustholes	Vide Myrtle	—	—	—	—	—	—
Esmonde	Wadnamanga ..	30 10 0	34 1 11	126	10	1	83
Eureka	Woodside	708 0 3	448 10 2	1,446	11	8	40
Evening Star	Tarcoola	11 2 2	14 5 23	42	19	0	77
Eclipse	Tarcoola	42 4 0	35 8 16	124	10	10	59
Eudunda Hope	Mannahill	32 15 0	7 18 13	30	13	4	18
Federal	Tarcoola	44 3 0	2 6 0	7	1	4	3
Federal	Woodside	41 1 0	20 16 11	81	18	6	39
Flagstaff	Birdwood	10 2 0	3 16 9	14	2	8	28
Fabian's Glenloth	Glenloth	18 10 0	18 18 13	72	17	7	78
Fabian's No. 2	Glenloth	31 13 0	14 5 4	45	12	8	28
Fabian's No. 3	Glenloth	952 3 0	1,191 3 12	4,026	19	3	84
Great Eastern	Wadnamanga ..	21 16 0	31 10 21	109	15	5	100
Gallipoli	Tarcoola	140 1 0	191 17 4	656	7	2	93
Government Mine	Tarcoola	445 6 0	1,024 16 22	3,386	1	1	152
Great Talunga (Black Snake)	Birdwood	369 4 3	225 7 15	834	0	1	45
Golden Gate	Angaston	159 4 0	283 9 8	1,185	15	8	149
Gowland's Reef	Mt. Torrens	101 8 3	29 11 4	106	7	3	21
Golden Thorpe	Woodside	205 17 0	86 18 10	342	4	6	33
Golden Junction	Mt. Grainger ..	222 15 0	149 13 12	570	18	4	51
Glen Markie	Glenloth	369 10 0	202 6 4	712	3	4	38
Great Glenloth	Glenloth	26 10 0	5 19 11	22	16	11	17
Glenloth Pioneer	Glenloth	37 19 2	29 5 9	106	18	8	56
Golden Stream	North-east	10 17 0	6 4 14	21	17	10	40
Glenloth Well	Glenloth	26 0 0	23 11 16	83	19	10	64
Golden Record	Wadnamanga ..	24 15 0	33 16 17	122	4	9	98
Hennig's	Parnaroo	98 12 0	22 11 10	78	0	3	15
Hall's Reef	Forest Range ..	50 10 0	68 10 1	247	13	11	98
Haklo	Birdwood	291 12 0	180 3 1	709	8	11	48
Homeward Bound	Mannahill	678 17 0	1,135 5 0	4,462	9	4	131
Hidden Secret	Birdwood	74 4 0	401 5 5	1,550	18	6	418

SUMMARY SHOWING TOTAL ORE TREATED, ETC.—*continued.*

Name of Mine.	Localty.	Weight of Ore.	Gold Bullion Recovered.	Total Value of Bullion.	Yield per Ton, in Shillings.
		Tons, cwt.s, qrs.	Ozs, dwts, grs.	£ s. d.	s.
Hidden Treasure	Tarcoola	52 10 0	36 14 5	117 8 1	45
Ironclad	Mt. Grainger ..	12 6 0	11 18 9	44 9 5	72
Klondyke	Mannahill	36 11 0	82 0 10	321 3 8	175
Kitticoola	Palmer	14 15 0	18 17 8	69 5 11	94
Kirkeek's Treasure...	Nillinghoo	485 0 0	780 11 9	2,845 15 0	117
King's Bluff	Olary	127 0 0	250 0 0	750 0 0	118
Lake Labyrinth	25 miles E. of Tarcoola	64 10 0	56 10 11	207 2 3	64
Last Resource	Tarcoola	152 15 0	108 9 20	384 1 9	50
Lease 938	Tarcoola	9 10 0	3 13 18	12 5 4	25
Lease 1022	Tarcoola	12 4 0	8 13 18	23 17 9	39
Lucky Hit	Birdwood	338 16 1	303 6 3	1,148 2 11	67
Little Crumb	Birdwood	77 11 2	136 14 7	516 5 7	133
Lux	Olary	265 8 0	156 4 21	550 17 0	41
Lady Alice	Barossa	24 1 0	49 15 22	195 13 4	162
Lady Edith	Peterborough ..	10 0 0	1 6 0	4 9 4	9
Lone Hand	Glenloth	446 10 0	522 5 1	1,840 11 11	82
Lake View	Glenloth	18 7 0	25 3 10	88 6 2	96
Last Chance	North-east	11 0 0	2 18 11	11 3 3	20
Morning Star	Tarcoola	307 0 0	555 15 7	1,876 4 10	122
Menzies Barossa ..	Barossa	23 14 0	15 1 14	52 10 0	44
Mount Torrens	Mt. Torrens	1,252 11 0	652 10 16	2,483 18 5	39
Mount Grainger	Mt. Grainger ..	690 3 1	725 17 14	2,872 8 6	83
Myrtle (Dustholes) ..	Mt. Grainger ..	282 7 1	109 6 23	387 14 5	27
Mount Mitchell	Glenloth	28 9 0	7 6 6	23 5 5	16
Medora	Mt. Grainger ..	200 0 0	182 6 23	694 9 9	69
Miners Dream	Mt. Grainger ..	18 13 0	9 3 18	33 11 10	35
Mount Paratoo	Paratoo	50 0 0	5 0 16	15 7 0	6
Mount Lyndhurst....	Lyndhurst	1 8 0	0 7 1	1 3 11	16
New Era	Woodside	794 18 0	455 6 13	1,756 6 2	44
New Eclipse or LeHunte	Woodside	189 5 0	141 13 23	529 16 9	56
New Milo	Wadnaminga ..	206 5 0	256 4 14	883 12 9	85
Nectar	Mannahill	18 14 0	28 10 23	109 2 2	116
Nil Desperandum ..	Glenloth	69 0 0	21 13 17	75 3 3	21
Nackra	Nackra	36 18 0	7 2 21	25 5 3	13
Outalpa	Outalpa	90 9 0	53 18 16	184 1 3	40
Perseverance (Gourlay's Claim)	Earea Dam....	34 10 0	16 7 11	62 17 7	36
Proprietary	Tarcoola	6 0 0	3 8 8	10 13 6	35
Pioneer	Callington	97 2 0	31 8 20	120 16 9	24
Phoenix	Gawler	11 15 0	6 6 8	21 9 6	36
Royal Charlie	Mannahill	20 7 0	5 10 5	15 19 1	15
Royal George	3 miles west Tarcoola	977 17 0	566 13 13	2,071 13 8	42
Railway	West Australia ..	14 2 3	15 0 23	51 16 2	73
Royal Tiger	Glenloth	53 5 0	32 5 15	115 4 10	43
Ruby	Barossa	16 2 0	23 7 23	88 13 4	110
Reddaway's	Mt. Torrens	137 7 1	33 13 22	108 10 4	15
Scotchman	Teetulpa	14 17 0	9 18 20	34 4 8	46
Spanish American ..	Mannahill	21 3 2	10 12 11	39 6 3	37
Shamrock	Tarcoola	48 0 0	77 13 23	303 1 9	126
Sims Section	Mt. Torrens	67 18 0	12 4 12	44 3 1	13
Schubert's Reef	Mt. Torrens	95 18 0	54 5 2	187 15 4	39
South Knappa	Woodside	7 13 0	3 7 11	13 2 6	34
Stars and Stripes ..	Mt. Grainger ..	20 3 0	5 18 10	22 17 7	22
Triumph	Wadnaminga ..	17 18 0	8 11 17	32 4 3	35
Tarcoola Blocks	Tarcoola	650 3 0	950 12 8	2,917 8 9	82
Tarcoola Blocks, Enterprise Lease	Tarcoola	402 11 1	484 10 20	1,661 19 5	89
Tarcoola United	Tarcoola	56 10 0	100 0 15	331 4 3	117

SUMMARY SHOWING TOTAL ORE TREATED, ETC.—*continued*.

Name of Mine.	Locality.	Weight of Ore.			Gold Bullion Recovered.			Total Value of Bullion.			Yield per Ton, in Shillings.
		Tons.	cwts.	qrs.	Ozs.	dwt.	grs.	£	s.	d.	
The Gem	Tarcoola	42	12	0	90	6	19	277	16	11	130
Tarcoola West	Tarcoola	53	5	0	63	14	4	253	5	11	95
Tarcoola Perseverance	Tarcoola	1,961	4	3	3,328	2	15	12,429	8	0	127
Tolmer's Hill.....	Tarcoola	6	0	0	1	11	16	5	8	0	18
Union Jack	Waukaringa ..	17	2	0	2	16	13	9	18	9	11
Ulooloo	Ulooloo	28	5	0	13	5	11	52	19	0	37
Vienna (Descovitch's Reef)	Mt. Pleasant ..	29	3	0	14	0	3	47	15	7	32
Virginia	Wadnaminga ..	13	1	0	18	10	14	68	6	1	104
Warrigal South	Tarcoola	73	12	3	107	2	12	341	1	6	92
Wondergraph	Tarcoola	30	5	0	57	0	4	200	4	6	132
Warrigal	Tarcoola	118	17	0	134	16	4	347	18	5	58
Wilgena Syndicate ..	Tarcoola	29	15	0	23	15	12	88	10	7	59
Wilgena Enterprise ..	Earea Dam.....	348	8	0	323	7	22	1,279	8	2	73
Wilgena Associated ..	Tarcoola	45	0	0	98	10	10	364	3	11	161
Wheal Ellen	Strathalbyn ..	68	0	0	18	9	5	62	8	11	18
Welsh Prince.....	Wadnaminga ..	10	0	0	3	10	13	12	8	0	25

COPPER.

AVERAGE MONTHLY PRICE OF COPPER, JULY TO DECEMBER, 1918.

	Standard.			Best Selected.			Electrolytic.		
	£	s.	d.	£	s.	d.	£	s.	d.
July	120	3	3	131	13	4	132	18	3
August	122	5	0	133	0	0	135	0	0
September	122	5	0	133	0	0	135	0	0
October	122	5	0	133	0	0	135	0	0
November	122	5	0	133	0	0	135	0	0
December	116	5	0	125	7	6	128	11	7
Average for the Six Months	120	18	0	131	10	1	133	11	8

AVERAGE PRICE OF STANDARD COPPER FOR THE LAST TEN YEARS.

	£	s.	d.		£	s.	d.
1909	58	17	2	1914	60	8	1*
1910	57	3	3	1915	72	12	9
1911	56	1	10	1916	116	1	3
1912	73	1	3	1917	125	2	4
1913	68	5	8	1918	115	11	6

Average for the 10 years, £80 6s. 6d.

* Quotations for nine months only.

GOVERNMENT DRILLING OPERATIONS.

REPORT BY THE SUPERVISOR OF BORING OPERATIONS.

During the half-year ended December 31st, 1918, the No. 1 diamond drilling plans was continuously employed at Moonta, within the area reserved from the operation of the Mining Act, in connection with the working of the Yelta Mine.

The staff of No. 2 drill, using a calyx drill, bored No. 2 bore at Bower to further prospect the lignite seam located in No. 1 bore. On the completion of this bore the drill was removed to Leigh Creek and a commencement made to prospect the southern basin of the coal measures.

No. 14 Bore.—No. 1 drill in charge of Mr. A. W. Matthews started and completed No. 14 bore, situated 30ft. to the west of No. 13 bore, Yelta Mine series. The bore-hole was laid out to cut the rich shoot of ore proved by No. 13 bore to exist in the Wild Dog or Eastern Lode, at a point 200ft. deeper on the plane of the lode. Sunk vertically to a total depth of 360ft. in felspar porphyry it cut the lode at 323ft. 6in. Two feet 6in. of lodestuff was cut assaying 8 per cent. of copper and no gold. Allowing for the dip of the lode the true width penetrated was 1ft. 6in.

No. 15 Bore was located 268ft. N. 44 degrees E. from No. 12 bore. This bore was sunk on a dip of 60 degrees to the S.E. to a depth of 302ft., and three lodes were cut.

No. 1, cut between 82ft. and 92ft. had a true width of 8ft. 2in.

No. 2, cut between 154ft. and 158ft. 8in. had a true width of 3ft. 9in.

No. 3 (the eastern lode), cut between 264ft. and 269ft., had a true width of 4ft. 1in. and averaged 11.25 per cent. of copper and 1dwt. of gold per ton. A footwall leader 8in. thick, separated from the main body by 3½ft. of country rock, assayed 2 per cent. of copper and 1dwt. of gold per ton. The balance of the hole was in felspar porphyry. Full details of the lodes and assays are given in the accompanying block.

TRUE WIDTH OF LODE FT. IN.	CORE		DEPTH IN FEET INCHES ALONG BORE	SEDIMENT		
	GOLD DWT. PER TON	COPPER %		COPPER %	GOLD DWT. PER TON	
8.2		0.1	84.0	0.6	NIL	Lode of Quartz, Schist, massive Haematite, felspar, & felspar porphyry, between 82 & 92 feet.
			88.8	0.3	"	
			87.8	0.8	"	
			88.8	0.5	"	
			88.8	0.7	"	
			89.8	0.6	"	
			90.8	0.6	"	
			92.0	0.6	"	
			92.0			
			92.0			
3.9		NIL	154.0	0.3	"	Lode of felspar porphyry, quartz, & massive haematite, between 154' & 158' 8"
		TR.	155.0	0.3	"	
			156.0			
			157.0	0.2	"	
			158.0			
		NIL	158.8			
4.1	1.5	14.1	264.0	22.5	1.5	SLIMES COPPER % GOLD
			265.0	21.7	1.5	
	1.0	12.7	266.0	19.4	1.0	
			267.0	22.8	1.5	
	TR.	4.1	268.0	12.0	1.5	
			269.0			
			270.0			
			271.0			
			272.0			
			273.0			
0.8			274.0			TR.
			275.0			
			276.0			

AVGE. 9.54

AVGE. 19.68

11.25% COPPER AVERAGE

1 DWT. PER TON GOLD

No. 16 Bore was placed 2,110ft. N. 54½ degrees E. from No. 15 bore and was laid out with a dip of 60 degrees to the S.E. This bore was placed a considerable distance ahead of the known portion of the eastern lode in the endeavor to locate its extension on No. 3 Tribute Block on the Yelta Mine area. It was sunk to a depth of 328ft. in felspar porphyry without cutting lode material.

No. 17 Bore, 200ft. S.E. of No. 16 bore, was laid out with a dip of 60 degrees to the S.E., and penetrated felspar porphyry to a total depth of 238ft., without cutting lode material.

No. 18 Bore is situated 200ft. N.W. from No. 16 bore and was laid out on a dip of 60 degrees to the S.E. On December 31st it had reached a depth of 148ft., all in felspar porphyry.

The calyx drill in charge of Mr. C. F. Duffield was engaged during the half year in prospecting for coal.

No. 2 Bore, section 156, hundred of Bower (see plan Review 28, p. 28) was started and completed.

From the surface to 100ft. parti-colored clays and some sands were passed through.

From 100ft. to 408ft. the drill penetrated marine Tertiary limestone with interbedded sands and clays. Carbonaceous matter was present in the core from 408ft. to 447ft., coloring the predominant sands and clays. The seam of brown coal was passed through between 423ft. and 428ft. and was of very poor quality.

Coarse quartz sand was present from 447ft. to 517ft. Bed rock was penetrated from 517ft. to 522ft. and consisted of a grey medium grained crystalline rock containing biotite.

The whole of the core recovered in passing through the coal seam was assayed by Mr. W. S. Chapman and gave the following results:—

Depth in Feet.	Nature of Sample.	Moisture at 105°C.	Volatile Matter.	Fixed Carbon.	Ash.	Sulphur.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
423-424	Undried	29.92	24.40	13.81	31.87	—
	Air dried	13.33	27.20	19.53	39.94	2.51
424-425	Undried	36.31	23.00	14.74	25.95	—
	Air dried	14.16	29.07	22.90	33.87	3.24
425-426	Undried	30.41	21.10	13.95	34.54	—
	Air dried	11.59	26.32	19.49	42.60	2.37
426-427	Undried	35.22	19.60	12.70	32.48	—
	Air dried	12.30	26.88	17.09	43.73	3.05
427-428	Undried	38.89	21.07	14.12	25.92	—
	Air dried	15.40	31.55	17.40	35.65	3.08

Comparison with the results of No. 1 bore given in Review No. 28, is very disappointing. The thickness is 5ft. as against 34ft. 4in., and the coal is of much poorer quality than that in the lowest portion of the seam cut in No. 1 bore.

On completion of this bore the drill was moved to the southern portion of the Leigh Creek coalfield and a hole was started.

After penetrating 44ft. of siliceous sand and sandstone the bore entered the carbonaceous strata of the coal measures, and continued in them until December 31st, 1918, when a depth of 400ft. was attained.

Plant remains, pyrite and thin veinlets of coal were cut various depths. None of the coal veinlets exceeded half an inch in thickness. The dip of the strata as shown by the core recovered is 12 degrees.

SUBSIDIES.

The Legislature provided in the Mining Act, 1893, and in previous measures for the encouragement of mining.

The following schedule shows what subsidies have been paid from the inception of the system to December 31st, 1918, and the sums repaid. In the ordinary way these repayments are made from profits—50 per cent. of such profits being devoted to repayments. In two instances only have the profits won enabled full repayments to be accomplished—the Crystal Mine, at Echunga, which repaid £76 7s.6d. from that source, and the once-famous New Alma and Victoria Mine, Waukaringa, which repaid in full the first subsidy, £3,000. The repayment of £2,100 by the Hamley Company was made on the sale of the property to the Wallaroo and Moonta Co. The remainder of the recoveries was derived from sales of mining plant held as security. The total of the subsidies advanced is £64,898 1s. 1d., of which £10,697 10s. 10d. have been recovered, and £2,250 written off, leaving a debit balance of £51,950 10s. 3d. Portion of this outstanding debt is represented by machinery that has fallen into the hands of the Government; add to this the value of the metals won, and the State in general will probably have benefited beyond the money value of the debit balance.

STATEMENT OF SUBSIDIES PAID FROM COMMENCEMENT TO DECEMBER 31st, 1918.

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.	Amount Repaid.
		£ s. d.	£ s. d.
Adelaide Crushing, Grinding, and Amalgamating Mill Co.	—	100 0 0	—
Algebuckina Gold Mining Syndicate	Algebuckina	52 10 11	52 10 11
Alma Extended Gold Mining Co.	Waukaringa	3,000 0 0	219 5 6
Backhouse, T. S.	Worturpa	100 0 0	—
Barossa Enterprise Gold Mining Coy.	Barossa, Hundred of ..	232 2 6	—
Belalie Copper Mining Syndicate	Bundaleer	392 12 3	—
Beltana Rapid Ore Treatment Syndicate	Near Beltana	596 8 4	—
Bevilaqua & Angel	Palmer (near)	57 18 0	—
Bird-in-Hand Gold Mining Co., Ltd.	Woodside	3,000 0 0	—
Blackfellow's Creek Gold Mining Co., Ltd.	Kuitpo, Hundred of ..	660 6 7	35 0 0
Callington Copper Mining Co.	Callington	143 8 7	17 0 0
Cockburn Copper Mining Co., N.L.	Mutooroo	273 18 5	173 13 8
Commonwealth Silver-lead Co., Ltd. (Wheal Ellen Mine)	Strathalbyn, Hund. of	750 0 0	440 3 3
Copper Hill Mining Co., N.L.	Kadina	391 15 0	115 0 0
Cornwall Copper Mining Syndicate, N.L. ..	Kadina, Hundred of ..	500 0 0	—
Countess of Jersey Gold Mining Co., N.L.	Wadnaminga	321 0 0	—
Cowell Consolidated Silver and Copper Mines	Hds. Miltalie & Hawker	406 9 8	25 0 0
Currency Creek Copper Mining Co.	Currency Creek	28 6 5	20 0 3
Crystal Gold Mining Co.	Echunga	563 17 6	176 7 6
Davis, A. (Dorris Fabian Mine)	Leigh's Creek, Near ..	357 0 0	—
Ding Dong Copper Mining Syndicate	Kanmantoo, Hund. of	124 0 4	—
Duke of Cornwall Gold Mining Syndicate ..	Mount Pleasant	458 17 4	43 10 0
Eagle Silver Mining Co., Ltd.	Glen Osmond	500 0 0	—
Ediacara Consols Silver Mining Co., N.L.	Ediacara	651 12 1	465 17 0
Enterprise Copper Mining Co., N.L.	Barossa, Hundred of ..	150 0 0	9 16 0
Enterprise Excelsior (Barossa Amalgamated)	"	2,000 0 0	—
Eureka Gold Mining Co., Ltd.	Woodside	1,500 0 0	—
Eureka Gold Mining Syndicate	"	340 17 11	—
Fels, J. A. R. (Nichol's Nob Mine)	Leigh's Creek, Near ..	150 0 0	—
Fifth Creek Central Silver and Copper Mining Co., N.L.	Fifth Creek	253 2 4	—
Fortress Hill Mining Syndicate	Fortress Hill	60 0 0	—
Foster, A. E. J. (David Copperfield Mine) ..	Hundred Onkaparinga.	19 5 0	—
Glenloth Mining, Battery, & Options Co., N.L.	Glenloth	515 4 7	515 4 7
Glenloth Wells Pioneer Blocks Co., Ltd.	"	100 0 0	22 18 5
Great Eastern Gold Syndicate, N.L.	Wadnaminga	300 0 0	—



LAKE BUMBUNGA, SHOWING HEAP OF STACKED SALT.



LAKE BUMBUNGA, SHOWING HEAP OF STACKED SALT.

STATEMENT OF SUBSIDIES PAID—continued.

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.	Amount Repa d.
		£ s. d.	£ s. d.
Gumeracha Gold Mining Syndicate	Gumeracha	75 0 0	—
Golden Junction Gold Mining Co., N.L.	Hundred of Coglin ..	231 10 0	—
Golden Point Claims	Wonna	50 0 0	—
Great Ironclad Gold Mining Co.	Teetulpa	218 6 9	—
Hakendorf, C. H., and Williams, J. (Glen- markie Mine)	Glenloth	221 17 6	12 0 0
Hamley Copper Mining Co.	Wallaroo	2,100 0 0	2,100 0 0
Homeward Bound and Klondyke Gold Mines, N.L.	Mannahill	192 17 1	38 18 6
Heithersay, J. (Kirkeeks Treasure Mine) ..	Waukaringa	819 8 0	3 19 9
Hunter Bros. (Lady Millicent and Nuccaleena Mines)	Mochatoona	699 19 10	12 0 0
Ireby Gold Mining Syndicate	Mount Grainger	35 4 3	—
Kanappa Copper Mining Co.	Hundred Angas	146 19 11	1 5 0
Kanmantoo Copper Mines Syndicate, N.L.	Kanmantoo	150 2 1	—
Kingsborough, W. A. (Benowrie Mine)	Near Cutana	31 18 6	—
Kirkeek's Treasure Gold Mining Co.	Waukaringa	691 8 1	—
King's Bluff G.M. Co., N.L.	Olary	622 0 8	—
Kohinoor Gold Mining Co., N.L.	Kangaroo Island	100 0 0	—
Kohinoor Mine (H. G. Taylor)	"	200 0 0	—
Lady Alice Gold Mining Co.	Barossa, Hundred of ..	1,797 2 3	—
Lady Franklin Syndicate	Port Lincoln	200 0 0	40 0 0
Leigh's Creek South Coal Mining Co., N.L.	Leigh's Creek	95 16 4	95 16 4
McMurtie's Claims	Kuitpo, Hundred of ..	199 19 11	—
Mingary Gold Mining Co.	New Luxemburg	400 0 0	—
Montacute Gold and Copper Mining Co., N.L.	Sixth Creek	400 0 0	—
Mount Victoria Mine	Bimbowrie	50 0 0	—
Mount Malvern Silver Mining Co.	Blackwood	491 3 6	—
Mount Malvern Silver-lead Mining Co., N.L.	Clarendon	1,539 6 4	—
Mount Pangæus Gold Mining Co.	Hahndorf (near)	56 1 4	—
Mount Monster Gold Mining Syndicate	Kuitpo, Hundred of ..	350 0 0	1 0 0
Mt. Grainger Ironclad Gold Mining Syn., Ltd.	Mount Grainger	21 18 10	—
Mount Torrens Gold Mining Co.	Mount Torrens	1,000 0 0	—
Mount Remarkable Mining Co., Ltd.	Wongyarra, Hund. of	122 8 1	15 0 0
Musgrave Ranges Prospecting Association ..	Musgrave Ranges	47 2 0	—
Mount Painter Corundum and Gem Syndicate	Mount Painter	47 3 1	—
Morning Star Gold Mining Co.	Teetulpa	68 4 6	—
Mutooroo Copper and Silver Mining Co., Ltd.	Mutooroo	500 0 0	500 0 0
Myrtle Gold Mines, N.L. (Dustholes)	Hd. Coglin	370 1 4	25 0 0
Nackara Proprietary Copper Mining Co., N.L.	Nackara	100 0 0	—
Nackara Proprietary Gold Mining Syndicate.	Nackara	100 0 0	—
New Banksia Gold Mining Syndicate	Nairne	250 0 0	—
New Alma and Victoria Gold Mining Co., Ltd.	Waukaringa	3,000 0 0	3,000 0 0
New Ajax Consolidated Gold Mining Co., N.L.	"	750 0 0	—
New Era Gold Mining Co., Ltd.	Woodside	1,000 0 0	—
New Glenloth Battery and Mining Co., N.L.	Glenloth	750 0 0	—
New Medora and Grainger Gold Mines Syn., N.L.	Mount Grainger	1,421 9 9	—
New Mingary Gold Mining Co.	New Luxemburg	250 0 0	—
New Mount Grainger Gold Mines, N.L.	Mount Grainger	393 7 1	220 0 0
Northern Mining and Smelting Co., N.L.	Mount Rose	350 0 0	3 15 0
North Nairne Gold Mining Co.	Nairne	500 0 0	—
North-West and West Australian Pros. Co.	North-west of S.A.	104 9 7	—
North-West Prospecting Association, N.L.	Tarcoola	150 0 0	—
Nil Desperandum Teetulpa Devt. Co., N.L.	Teetulpa	64 14 4	20 5 6
Nilpena Copper Mining Co., Ltd.	Blinman	290 5 3	—
Olivaster Silver-Lead Mining Co., N.L.	Hundred Yankalilla ..	300 0 0	—
Onkaparinga Dredging and Mining Co., and Echunga Propy. Hydraulic Gold Sluicing Co.	Biggs' Flat	1,050 0 0	700 0 0
Paull's Consolidated Copper Propy., N.L.	Burr Well	525 0 0	16 13 0
Parara Mining Co., N.L.	Maitland	571 3 6	—
Paringa Mining Syndicate	Callington	399 16 8	244 0 0

STATEMENT OF SUBSIDIES PAID—continued.

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.	Amount Repaid.
		£ s. d.	£ s. d.
Paringa and West Kanmantoo Consolidated Copper Mine, N.L.	Callington	1,144 3 4	210 5 0
Pioneer Gold and Copper Mining Syndicate	"	95 15 6	66 19 6
Poimear, W. J. L. (Poona Mine)	Kadina	800 0 0	31 0 0
Poonana Silver, Lead, & Copper Mining Syn.	Hundred Mann	137 7 10	—
Port Lincoln Copper Co., Ltd.	Reedy Creek	800 0 0	—
Prince Albert Mining Syndicate	Hundred Onkaparinga.	214 0 0	2 0 0
Queen Bee Mining Co., N.L.	New Luxemburg	250 0 0	250 0 0
Quorn Manganese and Silver Mining Co. ...	Quorn	10 9 10	—
Rapid Bay Silver Mining Co., N.L.	Yankalilla, Hund. of..	136 2 4	—
Robertstown Bright Silver Lead Mines	Hd. Bright	170 5 11	—
Royal Charlie Gold Mining Co.	Mannahill	153 18 5	—
Reus, R. (Ajax Mine)	Waukaringa	604 14 5	—
Saunders, L. E. (Great Eastern Mine)	Wadnaminga	98 10 0	—
Sixth Creek Gold & Copper Mining Co., L.N.	Sixth Creek	161 1 11	—
Stainbank, A. T.	Fifth Creek	70 14 11	—
Sliding Rock Copper Proprietary, N.L.	Sliding Rock	2,000 0 0	31 7 0
Tarcoola Blocks Gold Mining Co., Ltd.	Tarcoola	4,345 5 2	173 10 5
Tarcoola Enterprise Gold Mining Co., N.L. ...	"	100 0 0	19 10 4
Tarcoola Proprietary Gold Mines, N.L.	Tarcoola	150 4 4	9 15 0
Teatree Gully Gold Mining and Pros. Assn.	Teatree Gully	234 5 7	—
Teetulpa Mining and Crushing Co.	Teetulpa	349 11 4	—
Teetulpa Prospecting Syndicate	"	49 15 6	—
Trewartha S.H. (Royal George Mine)	Tarcoola	10 0 0	—
Tumby Bay Copper Mining Co., N.L.	Hutchison, Hund. of..	800 0 0	—
Utica Copper Mining Co. N.L.	Burra	224 16 7	109 18 6
Victoria Hill Amalgamated Gold Mining Syn.	Barossa, Hundred of ..	38 12 6	—
Victoria Tower Mining Co., N.L.	Mannahill	345 18 9	90 0 0
Walton Hill Copper Mining Syndicate	Near Freeling	50 0 0	—
Warrakimbo Propy. Copper Mining Synd. ...	Barndioota, Hundred of	220 16 2	—
Warra Warra Propy. Copper Mines, N.L. ..	Farina	322 4 11	322 4 11
Watt's Gully Gold Mining Co.	Gumeracha	50 0 0	—
Watt's Gully Reef Claims	Gumeracha	50 0 0	—
Wolters, F. C., & Co.	Echunga	25 0 0	—
Wollaroo Central Mining Co., N.L.	Kadina	500 0 0	—
Westward Ho Mine (Dr. H. Dixon)	Mannahill	1,000 0 0	—
Wohler, H., & Co.	Myponga	20 0 0	—
Wheal Turner Copper Mining Co., Ltd.	Prospecting on proposed line to Queensl'd Border	1,000 0 0	—
Winnininnie Gold & Silver Propy. Co., N.L.	Winnininnie	86 3 6	—
Woodside Boring and Mining Syndicate	Woodside	422 17 11	—
Worturpa Exploration and Mining Co., Ltd.	Worturpa	800 0 0	—
Yelta New Copper Mining Co., N.L.	Wollaroo	1,000 0 0	—
Young Bullfinch Gold Mining Co., N.L.	Talunga, Hundred of	146 3 4	—
Totals	—	64,898 1 1	10,697 10 10

Notes on the Sampling and Valuation of Prospects.

The Department of Mines, Flinders Street, Adelaide, frequently receives for assay and advice, parcels of various minerals and ores. Such a parcel may have one or more of the following faults:—

- (1) It may contain a single piece, obviously picked.
- (2) The quantity forwarded may be of insufficient size either for assay purposes or to properly represent the material sampled.
- (3) The parcel may be unaccompanied by any statement or request showing the information desired.
- (4) It may carry no marks to identify it with the letter of advice.
- (5) There may be no letter of advice.
- (6) There may be no declaration of the exact locality, without which free assays cannot be made.
- (7) The letter of advice may contain no information as to the width or size of the body from which the material has been taken—information which may be necessary before it is possible to advise as to the value of a deposit.

THE MEANING OF THE WORD "SAMPLE."

A specimen is not a sample. A specimen shows the nature of a rock or ore; a sample is intended to show its value, and must be representative of a pile of ore or of a lode at a definite place.

A "representative" sample is a small proportion of the original bulk, containing, in unchanged percentages, all the constituents of the original lot. Such a sample gives the value of a pile of ore. The average of a number of samples, broken from the workings of a mine, represents very closely the value of the material sampled. Both broken ore and mines are, in many cases, sold on the values arrived at by sampling.

HOW TO TAKE A SAMPLE.

In sampling a lode, samples should be taken at definite intervals, and the lode should be sampled over measured widths at these localities. Widths should be measured at right angles to the lode, that is, along the shortest line between the walls.

A sample must be taken by breaking the same bulk for each foot of width. This should be done as evenly as possible over the whole width that the sample is intended to represent, and all the material that would be subsequently milled or smelted, whether rich or poor, should be included in the sample. The quantity taken might amount to one pound per foot of lode width; but the nature of the ore body and the distribution of the values (whether uniform or irregular) must be considered when deciding on the size of the sample. With uniform values the interval along the lode can be greater and the amount broken less than if the lode carries irregular values, as in the case of a lode carrying coarse gold.

THE PROPER WAY TO REDUCE THE SIZE OF A SAMPLE.

Such a sample, if of any considerable size, should then be broken into smaller pieces, well mixed, and quartered down. Quartering down means that the broken ore, after mixing, is piled into a cone on a floor or cloth, and that the cone is flattened and subdivided into four parts by two cuts at right angles. If the ore is sufficiently broken and mixed the sample obtained by taking the two opposite quarters, A A, has a value equal to the rejections B B, shown in the following diagram:—



HOW A SAMPLE SHOULD BE QUARTERED.

At each quartering care should be taken to sweep all rejections away.

By successive finer crushing and quartering, a sample, of 1lb. to 2lbs. is obtained that has the same value as the bulk first broken from the lode. This sample of 1lb. to 2lbs. should then be properly bagged, marked, and sent for assay. It would be well to enclose a specimen of 1oz. to 2ozs. of the uncrushed ore for inspection.

In reducing the large sample first obtained it is essential that the lumps of ore be broken smaller by at least half between each quartering. For example, a sample averaging, as broken, 1in. pieces, might be broken to $\frac{1}{2}$ in., $\frac{1}{4}$ in., and $\frac{1}{8}$ in. particles before each successive quartering, to ensure uniform mixing and the even distribution of the valuable material.

THE USE OF ASSAY RESULTS.

Individual samples of standing ore may differ from the true value of the lode, but the average of a number of such samples will be very nearly that of the body of stone which they represent. Thus it will be seen that, in estimating the value of standing ore, reliance is to be placed, not on a single sample, but on the average value of a number of samples.

THE VALUATION OF BROKEN ORE.

Sampling a pile of broken ore may be done either by quartering, or by taking every second, tenth, or any other proportion of shovelfuls when shovelling the pile over, the proportion depending upon the way in which the values are distributed through the ore.

In sinking or driving on a lode, the value of the ore broken can be determined by making a separate pile with every fifth or tenth bucket of ore raised, and cutting down the small pile so made by shovelling and quartering. This procedure, if adopted, would in many cases prevent undue disappointment or the incurring of a loss through sending unpayable material to be treated.

ESTIMATION OF GOLD CONTENTS BY PANNING.

In estimating gold contents by panning during prospecting work, representative samples of constant weight or bulk should be taken. Too often a selected lump of kindly appearance is crushed, with the result that the value of the ore is over-estimated, and disappointment results when a parcel is sent to a battery. A record kept of all panning results, and the position and width of lode over which a sample is taken, will do much towards facilitating the opening up of a mineral property.

SUGGESTIONS FOR TAKING AND FORWARDING SAMPLES.

It is suggested that the following precautions be taken in sending samples for assay:—

- (1) Each sample should be taken so as to be representative of the material sampled.
 - (2) Each sample should be properly marked so that it can be identified by the Department and by the sender.
 - (3) A letter of advice referring to these marks should be sent containing particulars as to—
 - (a) The exact location of the material sampled relatively to some well-known point.
 - (b) The width over which the sample has been taken.
 - (c) The depth at which it was taken.
 - (d) What valuable constituent is supposed to be present.
-

The Department reserves the right to refuse to make any particular assay of samples of insufficient promise or which do not conform to the conditions enumerated above.

No assays will be made of metallurgical products, and no umpire samples or materials showing free gold will be tested.

ACCIDENTS IN MINES AND QUARRIES.

A gratifying feature of our mining operations in mines and quarries is the infrequency of serious accidents. Act No. 858 of 1904, bringing quarries in the same category as mines as regards the control of the Department of Mines has been effective in safeguarding the interests of quarry-men. The following table gives the number of accidents in mines and quarries during the last ten years:—

ACCIDENTS IN MINES AND QUARRIES.

ACCIDENTS IN MINES.				ACCIDENTS IN QUARRIES.			
Year.	Total Number of Accidents Reported.	Number of Persons Injured.	Number of Persons Killed.	Year.	Total Number of Accidents Reported.	Number of Persons Injured.	Number of Persons Killed.
1907	10	4	6	1907	3	1	2
1908	5	4	1	1908	—	—	—
1909	6	5	1	1909	1	1	—
1910	6	3	3	1910	2	1	1
1911	2	—	2	1911	—	—	—
1912	3	2	1	1912	2	—	2
1913	10	8	2	1913	—	—	—
1914	3	2	1	1914	3	2	1
1915	3	—	3	1915	3	2	1
1916	5	1	4	1916	—	—	—
1917	8	6	2	1917	2	2	—
1918	7	5	2	1918	2	2	—

ASSAYS AT SCHOOL OF MINES.

NUMBER OF ASSAYS MADE FOR PUBLIC PURPOSES AT THE
SCHOOL OF MINES ASSAY DEPARTMENT DURING THE
SIX MONTHS ENDED DECEMBER 31st, 1918.

	1918.					
	July.	August.	September.	October.	November	December.
Department of Mines	118	71	94	108	61	126
Public assays	76	87	69	85	37	47
Totals	194	158	163	193	98	173



WARDANG ISLAND. ONE OF THE FACES FROM WHICH CALCAREOUS
SAND FLUX IS OBTAINED.



WARDANG ISLAND. MAIN LIMESTONE FLUX QUARRY ON
WESTERN COAST.



SUMMARY REPORT ON THE UTILISATION OF LEIGH CREEK COAL BY THE LEIGH CREEK COAL COMMITTEE.

The following summary comprises an account of the information available with regard to the Leigh Creek Coalfield and the experimental work that has been carried out with the object of ascertaining how the coal may best be utilised.

1. PARTICULARS WITH REGARD TO THE COALFIELD.

The coal measures occupy an area of over 42 sq. miles, being contained in two depressions or basins of unequal size. The exploratory work hitherto carried out has been performed in the central portion of the more northerly basin, which is the larger. Little is known of the southerly basin, within which the township of Copley is situated.

The main seam in the northerly part of the field has been proved by shafts and bores (the latter having been continued right through the coal measures into bed-rock) to be over 45ft. thick, and the general characteristics of the coal do not vary with depth in this explored area. At 1,500ft. there was obtained from a bore coal similar to that worked from the shaft at a depth of 250ft. from the surface. The upper part of the seam is certainly the best in that it contains the least ash. The recent detailed sampling of the mine by the Department of Mines showed the coal seam, as a whole, to have the following composition :—

	Maximum.	Minimum.	Average.
Water at 105° C.	32·86	20·22	27·15
Volatile matter	33·06	21·39	25·24
Fixed carbon	39·46	27·74	33·68
Ash	23·86	4·79	13·91

The parcels of coal sent away from the mine for recent experimental testing were won from the best portion of the seam, and a considerable quantity was kept under cover and thoroughly air-dried before being used.

2. WORKING TRIALS CARRIED OUT BY THE RAILWAYS DEPARTMENT.

A comparative test between Leigh Creek coal and Newcastle coal was carried out at Islington in January, 1893, on a stationary boiler in the smith's shop. The records contain no mention of the type of boiler, the measurements of the grate, and the analysis of the coal used. The ash from the coal proved large in amount ; it was necessary to stop the engine on several occasions to get up steam ; and it proved difficult to maintain a steam pressure of 80lbs. to the square inch. Newcastle coal, used under like conditions as a check, enabled the working pressure of 80lbs. to the square inch to be attained more quickly and maintained without difficulty under the working load.

Arrangements were made by the Railways Commissioner in 1900 to carry out a seven days' test on a stationary pumping engine, at Eurelia. The records show that about twice as much Leigh Creek coal was used as was found necessary when Newcastle slack coal was employed, and a double quantity of firewood was consumed in lighting up. The ash was large in amount, and it was found difficult to maintain an even pressure of steam.

Consequent upon a resolution carried by the House of Assembly in December, 1896, a trial, extending over eight weeks, in locomotive engines was carried out on the line between Port Augusta and Marree (Hergott Springs). Leigh Creek coal was tested by itself and also with Newcastle coal in the proportions of 2 to 1, 1 to 1, and 1 to 2. An English class "Y" engine and an American class "X" engine (the latter being fitted with an improved extended smokebox and exhaust pipe) were used in these tests. The loads were generally up to the limit. A representative of the Leigh Creek Coal Company watched the trials in the company's interests, and his suggestions were followed.

The results were unsatisfactory in that the smallest proportion of Leigh Creek coal used as fuel prevented the engines from maintaining steam enough to run up the steep grades. The coal was found to clinker badly, and time was lost at stations in cleaning out the fires. The time table could be kept fairly well by making up time in favorable places to balance the delay on up grades. It was found that the sparks emitted were dangerous in spite of spark arresters; and during the experiments 34 fires broke out in the empty trucks and trucks of goods on the trains. The country was, at the time of the trials, devoid of grass along the track. Difficulty was experienced from the tendency of the coal to fall to pieces in the hot weather within three weeks of the time of mining. During these trials the following figures, showing the increased consumption of coal over that necessary when only Newcastle coal was used, were obtained :—

Parts of Leigh Creek Coal.	Parts of Newcastle Coal.	Percentage of Increase in Coal Consumption.	
		Class "X" Engine.	Class "Y" Engine.
1	2	3·7	4·08
1	1	20·37	10·88
2	1	27·78	27·21
All	None	323·46	209·52

3. WORKING TRIALS ON VARIOUS TYPES OF BOILERS IN ADELAIDE.

A number of tests were carried out in 1917 and 1918 with the coal recently raised from the mine on different types of boilers, under the supervision of the Committee and the Chief Inspector of Boilers. Detailed records have been obtained, from which it appears that the amount of water evaporated, from and at 212° F., per pound of coal consumed ranged from 2·79lbs. to 5·33lbs. The latter result was obtained on good lump coal.

With a plant properly designed for the consumption of Leigh Creek coal a duty of 5lbs. of water per pound of the best coal may be reasonably expected. For purposes of comparison it may be stated that good dry wood gives a duty of 3·5lbs. to 4lbs. of water evaporated per pound of fuel consumed, according to the type of boiler used. Coal from New South Wales gives a duty of 8lbs. or more.

Trials made by the South Australian Harbors Board on a tug showed that when burning Leigh Creek coal at double the rate of Newcastle coal steam pressure could not be maintained, and that the fire clinkered badly. A mixture of equal parts of Leigh Creek and Newcastle coal was workable, but was unobtainable at the time. Similar results were obtained after trial on a dredger and steam-hoppers. The conclusion arrived at was that the use of Leigh Creek coal by itself, in the boilers with which the tests were carried out, was not feasible.

4. BOILER TESTS CARRIED OUT BY THE BROKEN HILL ASSOCIATED SMELTERS PROPRIETARY, LIMITED.

By courtesy of the Broken Hill Associated Smelter Company, who carried out tests in Melbourne with a parcel of Leigh Creek coal, it is possible to state the results of a test on a Stirling boiler. In the actual test 4·017lbs. of water were evaporated, from and at 212° F.; and the opinion was expressed that, with proper boiler and furnace design, 5lbs. could be evaporated per pound of Leigh Creek coal, as against 8lbs. of water per pound of bituminous slack coal.

5. TESTS CARRIED OUT IN GAS-PRODUCER PLANTS.

At the Peterborough Electric Light Station tests were carried out by the Engineer in charge of the Corporation Plant. It was found that, when using four parts of Leigh Creek coal to one part of wood, the plant could be run satisfactorily at a consumption of 2·86lbs. of the mixed fuel per brake-horse-power hour.

The Broken Hill Associated Smelters Proprietary, Limited, also carried out tests, and have generously made available the results obtained. In these tests it was found that 1·76 tons of Leigh Creek coal are equivalent to one ton of bituminous coal in gas production. The opinion was expressed that if the prices of the coals were proportional to the heat values in each there was no reason why Leigh Creek coal should not make a perfectly useful producer fuel on a modern mechanical producer.

6. THE USE OF LEIGH CREEK COAL AS A PULVERISED FUEL.

The Leigh Creek coal can be successfully pulverised to the necessary degree of fineness with proper appliances. Tests have been made by the Broken Hill Associated Smelters Proprietary, Limited, and by the Commercial Chemical Company at Port Adelaide. The results available are inconclusive, and further work on this method of the utilisation of the coal is in hand. Two parcels have been forwarded to America, and another parcel to Melbourne for testing, and the results are expected to be available shortly. Hitherto it has not been possible to make any trials of Leigh Creek coal in a pulverised state in locomotive engines.

7. THE BEHAVIOUR OF LEIGH CREEK COAL ON EXPOSURE.

As it comes from the mine Leigh Creek coal carries from 20 per cent. to 33 per cent. of moisture, and from about 5 per cent. to 24 per cent. of ash. The lower the ash the higher the moisture. On exposure to the atmosphere in a shed the moisture is slowly given off until it is reduced to between 10 per cent. and 14 per cent. Drying in the sun will bring the moisture down to 7 per cent., but the coal takes up moisture again until the content is about 11 per cent., at which proportion it could be marketed if kept from exposure to the weather. It has been found that the coal when dried must not be exposed to the weather, since it quickly takes up water again to the amount of from 20 per cent. to 30 per cent., and in this process not only is the fuel value spoilt, but the tendency towards disintegration is accentuated. A valuable series of observations on the moisture content under varying conditions of temperature and humidity has been made by the Department of Chemistry.

8. THE RESULTS OF EXPERIMENTAL DISTILLATION TESTS.

Leigh Creek coal can be retorted like ordinary bituminous coal, but the products obtained differ materially from those obtained from coal such as that from Newcastle. In the first place the amount of gas given off is only 5,140 cub. ft. per ton, whereas Newcastle coal gives about 12,000 cub. ft. per ton. The gas has a calculated calorific value equal to 346 B.T.U. per cubic foot of gas. Again, the tar produced is small in

quantity, being about 1 per cent. as against 6 per cent. from Newcastle coal; and it differs in character, being of an oily nature and apparently containing paraffin wax. The aqueous distillate, although containing nitrogen, is not alkaline in reaction. There is thus a very important difference from both a practical and scientific point of view between the Leigh Creek coal and ordinary bituminous coal. The residual matter left in the retort after distillation is friable and not at all like coke, but it contains about 56 per cent. of fixed carbon. These investigations have been carried out by the Department of Chemistry.

9. THE CALORIFIC VALUE OF LEIGH CREEK COAL.

The evaporative power of the coal in actual practice has been mentioned above in connection with the tests in steam boilers. Few determinations of the calorific value have yet been made in modern calorimeters. Samples thus tested by courtesy of the Municipal Tramways Trust have shown a calorific value for the air-dried coal (containing 11 per cent. of moisture) of from 6,800 B.T.U. to 7,800 B.T.U. per pound of coal. The ash and moisture free coal may be considered to have a calorific value of 12,000 B.T.U. per pound.

10. THE BRIQUETTING OF LEIGH CREEK COAL.

During the last three years a large number of briquettes have been made in the University Engineering Laboratory, and others have been prepared in the Department of Chemistry, with the object of finding a way of making briquettes that will offer a reasonable prospect of proving a commercial success. It is not difficult to make briquettes, the difficulty being to find a binding material that is not so costly as to make its use out of the question when the location of the mine is taken into account. A number of briquettes have been made under high pressure—up to 20,000lbs. to the square inch—with no binding material added. The briquettes so formed looked well when first made, but most of them gradually went to pieces, and they would not stand exposure to the weather. The best results were obtained from finely powdered coal, air dried to 11 per cent. of moisture. These, if kept dry, stand handling fairly well. As there is a large deposit of gypsum at Leigh Creek, plaster of Paris was tried as a binder. It has the disadvantage of adding to the high percentage of ash already in the coal, but it can be cheaply obtained on the spot; and briquettes made two years ago and containing only 4 per cent. of plaster of Paris, are still quite strong and firm. These briquettes burn quite well in an ordinary grate, but they will not stand exposure to the weather. Other binding materials have been tried and good briquettes made, but would be more expensive on account of the freight to Leigh Creek. A serious disadvantage with all briquettes made is that they fall to pieces if soaked in water. They can be made waterproof by dipping them in hot tar, when they take up about 10 per cent. of their weight. Even this method is not altogether satisfactory, since, if any cracks are present and water gains access to the interior of the briquette, it falls to pieces. Moreover, the cost of waterproofing the briquettes is such that the process becomes commercially uneconomical.

11. ALTERNATIVE SOURCES OF FUEL IN SOUTH AUSTRALIA.

The Committee has given consideration to the question of providing fuel from other sources than Leigh Creek. On its recommendation boring has been carried out with a core-producing drill at Bower, between Eudunda and Morgan, and a core of the brown coal has been obtained for the purpose of comparative tests.

This drill will shortly be sent to Leigh Creek to test the hitherto unexplored parts of the field.

Other deposits of brown coal in this State have also come under the review of the Committee.

In submitting the foregoing summary of the work that has been carried out on Leigh Creek coal, it is felt that special stress should be laid upon the fact that all the working trials, of whatsoever character, performed have been made in plants designed for the consumption of a higher grade of coal. It is not reasonable to expect that the best attainable results can be secured with the use of boilers built for raising steam with bituminous coal of normal character. The types of grates employed and the areas of the fireboxes were not specially adjusted for this particular coal. The results hitherto obtained may be therefore considered capable of material improvement.

The Committee would express its grateful appreciation of the action of the School of Mines and of those firms that generously placed plants at its disposal for the purpose of conducting the trials.

If the testing of the coal is to be carried to finality the construction of specially designed boilers of different types is essential; and for the purpose of building them the necessary funds must be rendered available.

R. W. CHAPMAN, Chairman of the Leigh Creek Coal Committee.

August 19th 1918.

REPORTS FORMING ADDENDA TO THE RECORD OF MINES.

REPORTS

BY THE

Assistant Government Geologist (R. Lockhart Jack, B.E., F.G.S.)

REPORT ON THE ALUNITE DEPOSIT AT RAPID BAY, SECTION 206, HUNDRED OF YANKALILLA.

NOTE.—Reports on the South Australian alunite deposits are published in the following Mining Reviews :—Carrickalinga Head, section 265, hundred of Myponga—Review No. 19, page 39, and Review No. 26, page 63 ; hundred of Napperby, section 310—Review No. 21, page 25, and Review No. 26, page 64 ; hundred of Ramsay, section A—Review No. 28, page 51 ; Curramulka—Review No. 29, page 37 ; Rapid Bay, section 206, hundred of Yankalilla—Review No. 29, page 36.

A discovery of alunite has been made in the cliff of the north-eastern headland of Rapid Bay. The deposit is situated just below the top of the cliff, at an elevation of about 300ft. above the sea. It was seen by the writer on September 6th, 1918.

The rocks of the vicinity are probably Cambrian in age, but may be even older, and dip inland or to the S.E. about 30°. In descending order they consist of quartzite and slate, a somewhat ferruginous slate and an argillaceous band with a dark crust developed for a width of about 10ft. along the face of the cliff. The dark color is due to graphite, about 1 per cent. being present. The argillaceous band is probably due to the removal by solution of the carbonate of lime from an argillaceous limestone. Beneath this is an extensive exposure of thin bedded siliceous limestone.

The alunite occurs as nodular masses up to a foot in diameter in the dark clay immediately above the undecomposed siliceous limestone, and is comparable in potash content and in appearance to that of Carrickalinga Head. It contains over 10 per cent. of potash (K_2O).

An incline about 20ft. in length follows the alunite-bearing zone to a point where undecomposed limestone forms the face. The alunite appears to be present overhead at this point. A small opening in the floor of the incline shows that the alunite does not penetrate the limestone underfoot. The maximum width of alunite-bearing ground is 6ft., with the alunite occurring as irregularly distributed nodular masses. The alunite is present in fair amount in this incline and is associated with a small proportion of wax-like clay, probably montmorillonite. The face of the cliff for about 20yds. to the N.E. shows the alunite-bearing zone to be about the same width, and with probably about the same proportion of alunite. Beyond this the zone is concealed for 30yds. or 40yds. by detrital slate and soil, through which pieces of alunite are scattered. Small openings to the N.E. of this detritus and to the S.W. of the main opening show that the alunite has diminished in quantity to an unworkable proportion.

The overlying slate is ferruginous and contains a fair percentage of potash, though not in the form of alunite. It has been suggested by the writer (Review No. 28) in discussing the origin of the Ramsay deposit, that the alunite might be due to the reaction of sulphates, derived from the decomposition of pyrites in the overlying clay, on the potassic minerals in the clay and that the limestone underlying the clay acted as a precipitant by destroying the soluble sulphates.

The stratigraphical sequence at Rapid Bay is very similar to that at Ramsay, although the geological age is widely different. In each case ferruginous argillaceous material containing potash rests upon limestone, and it is probable that the chemical processes that gave rise to the deposits would be similar. In the case of Rapid Bay, weathering of the slate to enable decomposition of the pyrite to take place would be an essential preliminary to the formation of the deposit, and so, if this theory of origin is correct, the deposit will not be found beneath the zone of weathering. As the strata are dipping at about 30° inland it is therefore improbable that the alunite will be found to extend very far in this direction, owing to the limitation of weathering under the increasing depth of cover.

The Rapid Bay deposit thus appears to be unlikely to yield any very large tonnage of alunite, but what is present is very high grade.

The development and working out of a method of treatment of much larger though lower grade, deposits occurring in South Australia should afford a ready outlet for the high-grade alunite of the Rapid Bay deposit. (6-9-18.)

REPORT ON THE ALUNITE DEPOSIT AT SHEAOAK FLAT WELLS, HUNDRED OF CURRAMULKA, YORKE PENINSULA.

The deposit is exposed in the Tertiary cliffs fronting the sea on a frontage reserve opposite sections 44, 45, hundred of Curramulka. Sheaoak Flat Wells, at the northern limit of the exposure, are 5 miles N. of Port Vincent.

The rocks containing the deposit are of Tertiary age and consist in ascending order, of sandstone horizontally disposed, polyzoal limestone, clayey, and sandy somewhat calcareous beds, the small alunite bed, 8ft. to 10ft. of sandy clay, the large alunite bed and red clay.

Apparently these beds are horizontal, but in three-quarters of a mile there is a dip of 35ft. to the northwards.

Five miles to the N.W. on section 127, a bed of sandstone underlying the polyzoal limestone dips 15deg. to the S.E., so that there is every likelihood of the clay overlying the alunite bodies extending inland for a considerable distance. As in the case of the Ramsay section A deposit, the alunite occurs in irregular layers from thin films to several inches in thickness and as nodular masses arranged in layers. In fact, the genesis and habitat of the two deposits are identical. The deposit was traced from a point two chains S. of the southern boundary of section 44 to a point 66 chains N. of that boundary and is visible at a height of 50ft. at the S. and 15ft. at the N. end above the sea.

The cliff made the deposit inaccessible except at intervals, and it was impossible to estimate as closely as at Ramsay. (*Vide* Review, No. 28.) In some portions the outcrop is obscured by surface debris, but there is no doubt as to the continuity of the bed, and of the absence of any faulting or of vertical feeders. Where the bed could be examined closely the width was found to vary between 3ft. and 6ft. with an average of not less than 4ft. to 4½ft. The quantity of alunite in the exposures was estimated to range from $\frac{1}{7}$ to $\frac{1}{3}$. In the locality where $\frac{1}{3}$ was estimated to be

present a little more than half was present in layers of less than an inch in soft argillaceous sandstone beneath red clay. It was estimated that about one-quarter of the deposit was alunite, and allowing for seams too small to be profitably separated it is probable that between one-sixth and one-fifth of the minimum average width of 4ft. could be recovered. The figures given can only be regarded as an approximation based on the assumption that the inaccessible and debris covered portions of the outcrop are of similar grade to those that could be examined.

The overburden ranges from 20ft. to 40ft. along the coast and increases somewhat as the bed is followed inland.

Genesis.—In a report on the deposit in section A, Ramsay, the writer suggested as a possible explanation that the deposits might owe their origin to sulphates generated from pyrite and potash present in the overlying clay. It may be noted that the deposits are both beneath highly ferruginous clays, so that it is reasonable to expect the generation of sulphate.

In this deposit, near the northern end the underlying sandstone and clay are green with sulphate of iron which may be observed crystallised on the cliff face.

It was thought by the writer that if excess of sulphuric acid had been present, it would have been destroyed by the underlying limestone with formation of gypsum, and a sample of the limestone collected from beneath the alunite bed at Ramsay was analysed by Mr. W. S. Chapman to determine this point.

The analysis and calculated mineral composition are as follows:—

	Per cent.
Silica	45.28
Alumina	4.98
Ferric oxide	4.12
Magnesia	0.86
Lime	21.22
Soda	0.57
Potash	1.23
Water at 100° C.	1.81
Water over 100° C.	1.60
Carbon dioxide	17.60
Sulphur trioxide	0.46
Chlorine	0.64
	<hr/>
	100.37
Less O = Cl.	0.15
	<hr/>
	100.22

Calculated Mineral Composition.

	Per cent.
Sodium chloride	1.02
Pot. chloride	0.04
Gypsum	0.24
Limestone	39.55
Limonite	3.32
Alunite	0.90
Silica and silicates	53.30
Excess carbon dioxide	0.05
Moisture	1.81
	<hr/>
	100.23

The practical absence of gypsum indicates the absence of excess sulphuric acid beyond that required for the production of alunite.

The alunite may be expected to be persistent for some distance inland as the limestone is known to extend for a considerable distance and it is probable that the bed of ferruginous clay will also have considerable lateral dimensions.

The following samples were taken :--

No. 1.—12 chains from opposite the S.E. corner of section 44, to represent commercial grade.

No. 2.—14½ chains from sample No. 1, commercial grade.

No. 3.—Same locality as No. 2, pure alunite from interior of nodules.

No. 4.—66 chains from opposite S.E. corner of section 44, commercial grade.

	No. 1.	No. 2.	No. 3.	No. 4.
Silica	9.64	8.74	2.10	30.24
Alumina	31.80	35.52	35.64	35.82
Ferric oxide	—	—	0.70	—
Magnesia	—	—	nil	—
Lime	—	—	nil	—
Soda	—	—	1.32	—
Potash	8.40	8.56	10.10	2.88
Water at 100°C.	—	—	0.17	—
Water over 100°C.	—	—	13.70	—
Carbon dioxide	—	—	nil	—
Phosphoric anhydride	—	—	0.20	—
Sulphur trioxide	31.46	31.38	35.79	10.70
Chlorine	—	—	0.06	—
			99.78	

The results of No. 1 and No. 2 are probably more truly representative of the grade of the deposit than No. 4, which could be seen to be contaminated with a proportion of white clay. The lower seam of alunite is about 8ft. to 10ft. below the main seam, and is persistent over a considerable length. It has a width of perhaps 18in. and a content of one-quarter to one-sixth of alunite, and has not been taken into account.

The main deposit can only be regarded as a very large and important body, and should be capable of supplying all the Australian demand for potash until the release of foreign potash salts and the reduction of freights reduce the price below that at which it will be profitable to mine and manufacture potash salts from alunite. Mining can probably be best done by a system such as is adopted for coal or deep alluvial ground. The material can be mined without explosives, by undercutting and taking down the layers of waste and alunite separately, and packing as much as possible of the waste to support the worked out ground. (28-10-18.)

REPORT ON THE EMILY GOLD MINE.

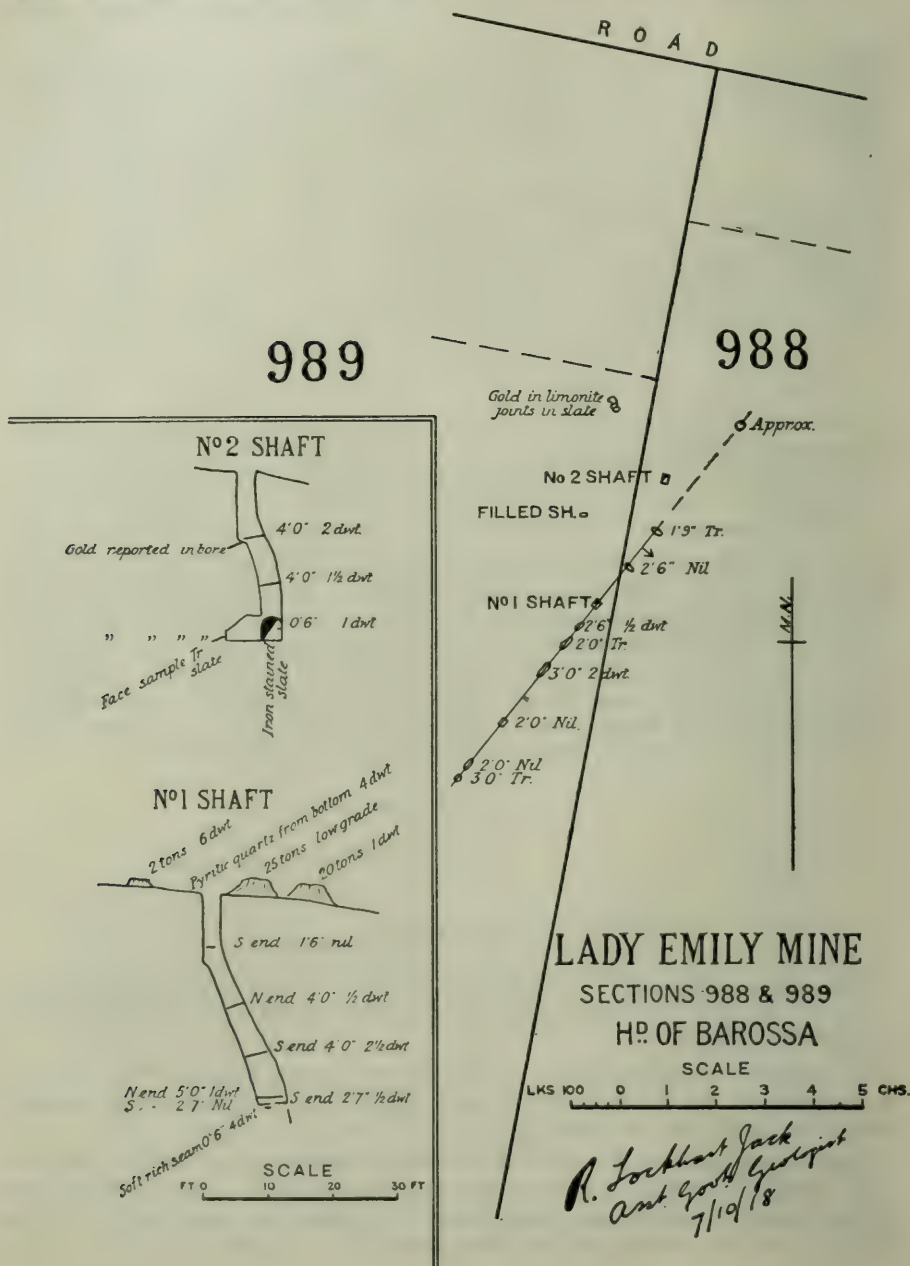
Parts sections 989 and 988, hundred of Barossa. These sections, situated about 1 mile to the S.S.E. of Williamstown, are private property with the mineral rights alienated from the Crown.

Three chains have recently been taken up by arrangement with the owners of the sections by the Emily Gold Mining Syndicate, and a considerable amount of prospecting work has been done.

The area is somewhat hilly and soil covered, practically no exposures of rock or of lode matter being visible. The rocks of the area consist of slate and schist more or less feldspathised and dipping very steeply. The lode was discovered by loaming up the slopes and trenching at the limit shown by the absence of gold.

A considerable number of openings along the line shows a formation to be continuous for 9 chains, and farther on prospecting gives every indication that the body will be traced still further to the N.E. To the S.W. of the known portion the depth of surface soil has caused the search in this direction to be suspended.

Gold has been found in what appear to be three separate formations. That on which the bulk of the work has been done crosses the boundary between sections 989 and 988 at an acute angle, 10.6 chains from the northern boundary and has a strike of N. 38° (magnetic) and a dip of about 70° to the S.E.



The outcrop has been systematically exposed at intervals for $5\frac{1}{2}$ chains S.W. of the intersection of the lode and boundary and for 2 chains to the N.E. of the same point. A further extension to the N.E. is indicated by the presence of gold in the soil, and in some small holes, which, however, were insufficiently opened to permit of sampling.

The main, or No. 1 shaft, 0.7 chains S.W. of the intersection, has been sunk vertically for 15ft. and thence on the underlie to 45ft. from the surface.

Exposures were systematically sampled at the following spots:—

Locality.	Depth.	Width Sampled.		Gold per Ton.
	Ft.	Ft.	In.	Dwts.
No. 1 shaft, S. end	11	1	6	Nil
No. 1 shaft, N. end	25	4	0	$\frac{1}{2}$
No. 1 shaft, S. end	35	4	0	$2\frac{1}{2}$
No. 1 shaft, special sample of soft rich seam in bottom	45	0	6	4
No. 1 shaft, N. end	45	5	0	1
No. 1 shaft, W. half, S. end	45	2	7	Nil
No. 1 shaft, E. half, S. end	45	2	7	$\frac{1}{2}$
Grab sample from 2 ton dump of soft ore raised from between 28ft. to 45ft.	—	—	—	6
Special sample from pyritic quartz broken at 45ft. depth.....	—	—	—	4
Grab sample from 20 ton dump on surface	—	—	—	1

In addition to the two dumps sampled there is one of about 25 tons which was understood to be lower grade material and which was not sampled.

The formation shows a well defined hanging wall, and on the hanging wall side for one to two feet in width is siliceous, merging into slate and schist on the footwall side. Specimens of gold in slate show evidence of secondary deposition, the gold being very thin and scaly and of high purity, and is arranged along cleavages.

The balance of the gold seen in panning is very finely divided. In the bottom of the main shaft and at the S.W. exposure a small proportion of pyrite is present, and the quartzose portions of the body show by the presence of cavities that pyrite was formerly present.

The size exposed ranges from 18in. to over 5ft. 2in. at the bottom of the shaft.

The outcrop had been well and systematically exposed, and the following samples were taken at depths of 1ft. to 3ft. :—

Locality.	Width.		Gold per Ton.
	Ft.	In.	Dwts.
1.9 chains N.E. from No. 1 shaft	1	9	Trace
.9 chains N.E. from No. 1 shaft	2	6	Nil
.6 chains S.W. from No. 1 shaft	2	6	$\frac{1}{2}$
1.1 chains S.W. from No. 1 shaft	2	0	Trace
1.75 chains S.W. from No. 1 shaft	3	0	2
3.1 chains S.W. from No. 1 shaft	2	0	Nil
4.3 chains S.W. from No. 1 shaft	2	0	Nil
4.6 chains S.W. from No. 1 shaft	3	0	Trace

The results of sampling on this lode are not encouraging. The three best samples (6dwts., 4dwts., and 4dwts.) were "specials" of material known by previous panning to be above the average. The results of assays are far below the expectations of the owners, based on panning tests, and it appears as if the large quantities taken in panning and the character of the gold have resulted in an over-estimation of values. Possibly familiarity with the richest class of stone has also been a factor,

as such stone is very often selected almost unconsciously as a preliminary to panning instead of cutting a sample in accordance with rigorous methods.

At a point half a chain to the N.W. of this outcrop, and opposite a point 3 chains along it in a N.E. direction from No. 1 shaft is No. 2 shaft, sunk on another body apparently parallel in strike and dip to the first formation.

This shaft was sunk vertically to 15ft., cutting a body of gold-bearing material dipping about 70° to the S.E. The shaft turned on this, but, becoming almost vertical again, appears to have got into footwall slate. The last 10ft. showed very little gold on panning. From the appearance of the formation it appears as if the lode has been left in the S.E. side of the shaft, and this should be tested by a shot in the hanging wall about 25ft. from the surface.

At 15ft. down a bore hole in the N.W. side is reported to have cut mineralised stone carrying gold, and a crosscut at 35ft. depth has been extended about 8ft. to the N.W. to try and pick it up. Prospects are understood to have been got in the face and from a bore hole. A sample of the ironstained slate in the face yielded a trace.

Nothing defined is visible in the crosscut.

At the bottom of the shaft a drive has been carried 4ft. to the S.W. in slate. The eastern 6in. shows iron staining, and is reported to give prospects. A sample from this 6in. yielded 1dwt. per ton.

The appearance of this 6in. of slate indicates that nothing of importance is probable, the gold being evidently secondary in its deposition and indefinite in location. The N.W. crosscut might be extended a further 4ft. or 5ft. in search of anything cut by the bore hole at 15ft.

Two samples were cut in the shaft, one at 14ft., and the other at 24ft. in depth over 4ft. of ferruginous slaty lode material. They assayed 2dwts. and $1\frac{1}{2}$ dwts. per ton respectively.

The body has the appearance of being to the E. of the shaft in the lower portion of the shaft.

Almost 2 chains to the N.W. an excavation shows 2ft. of soil and 3ft. to 4ft. of slate. The soil and iron-stained slate and veinlets of limonite yield good prospects, as finely divided gold and as very thin scales. No gold is obtainable in the deeper unstained slate, and there is nothing in the way of gold-bearing stone that can be followed. It is possible that this gold is secondary from a body uphill, still undiscovered. The excavation is at the limit of the area in which gold is found by loaming, but it is possible that the "creep" of the barren surface soil has covered gold-bearing material for a few feet. For this reason it would be advisable to trench 3ft. to 4ft. deep for perhaps 20ft. to the westward, in the hope of finding a body that can be definitely followed.

In any future operations it would be very advisable to test any lode material broken by (1) cutting samples in accordance with the notes on sampling published in the half-yearly departmental reviews, and (2) taking systematic grab samples from each bucket of ore raised and combining the grab samples taken over a certain footage or tonnage. In testing such samples they should be crushed to a definite size and a constant quantity (weight or bulk) taken for panning. With such a system, backed by occasional check assays of the material panned, there should be no difficulty in forming a much closer idea of values than has been the case in the past. (8-10-18.)

REPORTS

BY

The Chief Inspector of Mines (L. J. Winton, B.E.).

INSPECTION OF BROKEN HILL ASSOCIATED SMELTERS PROPRIETARY SMELTING WORKS AT PORT PIRIE.

On July 10th and 11th an inspection of the smelting works at Port Pirie was made with regard to the safeguarding of the employees against accident.

All machinery and gear was examined, and in most cases the belting, gearing, and moving parts were found to be efficiently protected. In some cases, however, precautions had been omitted, and in these cases instructions were given to have the defects remedied by suitable protection of the moving parts, gearing, or belting in question.

The want of precaution noticed in some cases arises, I think, mainly from the fact that the works are being largely re-modelled, and are consequently in a state of transition, the intention being to remove or alter much of the existing plant.

The plant is a very large one, and at the time of inspection was producing 450 tons of lead a day and about 3 tons of silver per week, an average of about 2,400 men being employed.

The management are pursuing a policy of betterment of the conditions for their employees. A large boarding-house has been established for their use, and comfortable and well-kept mess rooms are in existence on the works, provided with hot and cold water, where the various meals can be taken in comfort.

A co-operative store has been brought into operation by means of which employees can obtain stores and supplies, footwear, &c., at reasonable prices.

One of the outstanding difficulties has been the housing problem, and the company proposes to overcome this by the building of concrete dwellings for the workers. (15-8-18.)

REPORT ON THE OLIVASTER SILVER-LEAD MINE.

(*Vide Mining Reviews Nos. 21, 22, 25, 26, 27.*)

Situated on private property, section 1507, hundred of Yankalilla, about half a mile from the coast, at Rapid Bay.

Since the previous report in Review No. 26, a certain amount of work has been carried on in a small way.

No fresh work has been done at the bottom level of the main vertical shaft, but on the upper level, at a depth of 44ft. in this shaft, driving and stoping have been carried out on a small vein of galena, which carries a certain amount of silver also.

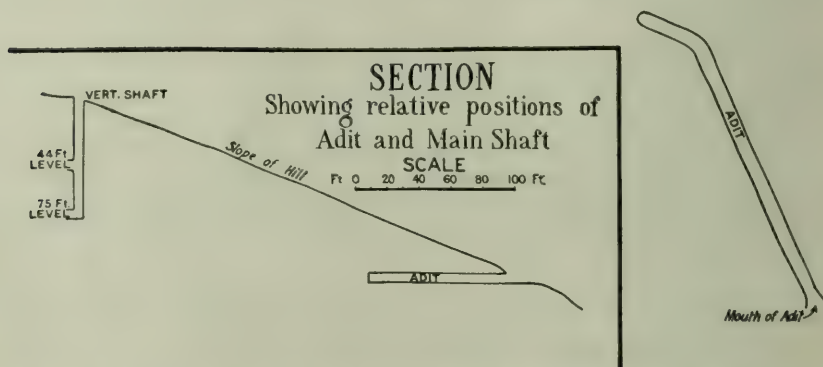
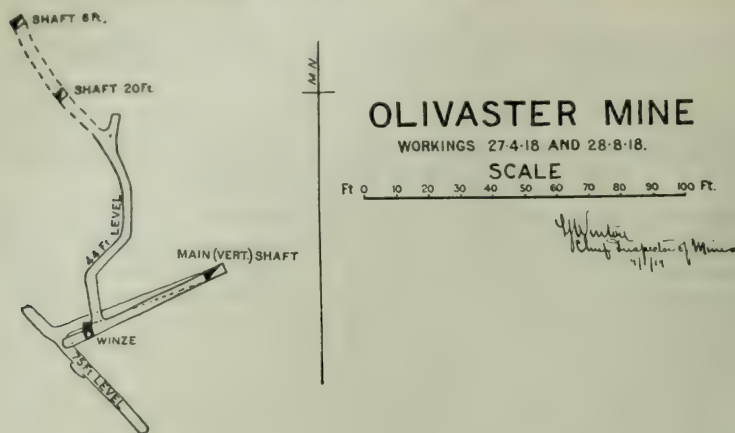
In one place this level, following the shoot of ore and gradually rising, connects with the bottom of a small shaft 20ft. in depth, and farther on connects with the surface by a short incline.

Another working off the drive at the 44ft. level follows a small seam of galena for some distance, until the seam appears to end at a vugh.

The hill upon which these workings are situated slopes down rather steeply to a gully on the E. side, the hill being about 125ft. in height above the bottom of the gully.

A little above the gully, at a point S. 41° E. of the main shaft, an adit level has been driven into the hill for some distance. This level is 115ft. lower than the top of the main shaft, and the entrance is 4.6 chains distant, measured on the slope of the hill, or 283ft. true horizontal distance.

The level of the tunnel is 40ft. below the bottom of the main shaft, and it would have to be driven a farther distance of 180ft. to bring it under that shaft.



The adit is driven 87ft. from the entrance on a bearing of N. 24° W., and then turns to the left and continues for 21ft. on a bearing of N. 65° W. to the face, following the course of a small quartz-ironstone seam showing a little lead ore.

This tunnel has been driven in hard limestone, and so far as it goes shows very little mineral matter.

On the joints of the rocks in places there is a thin layer of galena and calcite, a fraction of an inch thick, but not of any importance as an ore, and the tunnel has not so far disclosed the presence of any ore.

Ore deposits of this nature, in limestone, are well known to be generally of very great irregularity, both as regards size and shape, and offer considerably more difficulty in exploitation than most other forms of deposit, and about the only method that can be adopted is to follow the ore wherever found, even though the size of the seam may be inconsiderable, in the hope that it may lead to a larger body.

In this way it would have been preferable to follow the formation down from the shaft, keeping right on the ore, rather than to put in a long adit, which will at most only give 40ft. of backs up to the level of the old workings, as the adit will have to be driven a total distance of 283ft. to get under the shaft, and will then be only 40ft. below it. (30-9-18.)

THE DOME ROCK COPPER MINE.

This property is situated on Boolcoomatta Station, about 8 miles north-west of the old Benowrie Head Station, now known as Boolcoomatta H.S., which is itself distant about 17 or 18 miles by road N.W. of Mingary railway station on the Adelaide to Broken Hill railway line, the total distance from the mine to the railway station being thus about 26 miles.

The workings are situated a little over a mile S.S.E. from the Dome Rock, a well-known landmark in the district, and the ground at present held consists of 12 mineral claims, Nos. 10779, 10780, 10916 to 10923, inclusive, 10854, and 10855, each of 40 acres, some of these being held as suitable for a dam site.

The principal workings at present are on mineral claims 10779 and 10780.

Although a large number of mining leases had been taken up on the property and in the vicinity many years ago, this occurrence of copper ore apparently escaped notice, and is now being opened up and worked for the first time.

This is probably due to the fact that the lode does not outcrop at all, but is covered with a mantle of soil, its discovery in the present case being due to the presence of a few small copper-stained stones lying among the surface debris.

The copper ore shown in some shallow pits and trenches strikes in a general N.E.-S.W. direction along the N.W. slope of a low rounded ridge, not much elevated above the surrounding country, which is of open undulating character. The top of the rise shows masses of ironstone which would naturally invite prospecting, but which appear to contain no copper minerals. The surface of the ground is covered with debris consisting largely of iron-stained pebbles, quartz, and slate. Dykes of igneous rock, consisting of aplite, were noted in the vicinity of the lode. On the N.W. side of mineral claims 10779 and 10780, chistalites, or lucky stones, such as are found at Bimbowrie about 10 miles to the westward, were seen strewn over the surface, being set free from mica schists.

The general strike of the workings N.E. of the shaft is about N. 35° E., and the strike of the country as well as can be ascertained appears to be about the same, its dip being apparently to the eastward at about an angle of 60°.

On mineral claim 10780 a vertical shaft has been sunk to a depth of 30ft. This passes through about a foot of soil and then enters the lode formation consisting of more or less silicified, iron-stained, slate, in which the ore is found. No quartz is associated with the lode wherever it has been exposed. The ore consists of various oxidised and secondary copper minerals, consisting chiefly of cuprite, or red oxide, and grey ore or glance, with chrysocolla or copper silicate, of a bluish-green color, and atacamite, dark-green in color, and probably a certain amount of copper carbonate.

The ore occurs in masses of irregular nature and has been broken out from the shaft for a length of about 14ft. or 15ft., and at present can be seen in both ends and also in the bottom of the shaft. Practically all the ore that has been sold was obtained from this shaft.

As is well known, these rich oxidised and secondary ores are not permanent, but give place in depth to the original pyritic ore of lower value from which they were formed.

The depth to which the richer ore may be expected depends generally on water level below which it seldom extends for any distance, but it is also possible that it may not go down that far, owing to various circumstances, such, for instance, as the fact that the present water level may be lower than when the deposit was formed, owing to denudation of the surface in the course of time. The depth at which the richer ore will give place to the lower grade pyritic ore is thus uncertain and can only be determined definitely by sinking on it.

It is not certain at what level water will be found here, but judging from the evidence of wells in the neighborhood it will be over 100ft., and there is thus the possibility of obtaining the richer class of copper ores down to that depth.

At a point bearing N. 36° E., and 7.3 chains distant, from this shaft, a pit, No. 1, 3ft. deep, shows the presence of copper minerals, and 29ft. N. 27° W. from this pit, No. 2 pit has been sunk about 4ft., also showing copper minerals. Five chains N. 14° E. from the main shaft a trench, No. 3, shows copper minerals and stains over a width of 6ft., and 1.3 chains N. 38° E. from this latter another trench, No. 4, also shows copper minerals and stains.

Ten chains N. 34° E. from the main shaft is another pit, No. 5, about 5ft. deep, showing very good ore, red oxide, &c., similar to that seen in the main shaft.; 7.5 chains N. $38\frac{1}{2}^{\circ}$ E. from this pit there is another shallow trench, No. 6, in which stains of copper can be seen beneath the surface soil and travertine.

With the exception of the shaft and No. 5 hole, none of the others have been sunk deep enough to do more than indicate the presence of copper minerals, the first sign of which here consists of green stains or green ore, the more valuable grey and red ore appearing to lie beneath this, and these trenches and pits should be deepened a little to find out in each case the nature of the ore beneath.

Going towards the S.W. at a distance of 12 chains S. 29° W. from the main shaft is No. 7 trench, where green copper ore and copper stains are disclosed, and from which 2 tons of ore are said to have been sent away for treatment.

Forty-two chains S. $26\frac{1}{2}^{\circ}$ W. from here another trench, No. 8, has been cut to a depth of 4ft., and shows the presence of copper minerals about 9in. to 12in. wide.

The soil here is very much deeper, being out on the flat, and merely the top of the rock has been disclosed. The copper was discovered here through the burrowings of a rabbit, which brought some copper-stained material to the surface, there being no sign to indicate its presence otherwise.

Both Nos. 7 and 8 trenches require deepening to obtain more information as to the ore that may exist there.

The total distance from No. 8 pit at the S.W. end to No. 6 pit at the N.E. extremity is 72 chains, and no prospecting has been done farther N. or S. than this.

Sampling.—The sampling of rich ore, such as this, of rather irregular form, is very difficult other than by bulk sampling, but a couple of strip samples were taken from each end of the shaft at 28ft. down, in order to obtain an idea of the value of the faces in position.

No. 1 was a strip sample taken over a width of 2ft. 7in. at the S.W. end. On assay this gave the following result:—Copper, 40.5 per cent.; gold, $2\frac{1}{2}$ dwts.; silver, nil.

No. 2 sample was taken from a 4ft. face at the N.E. end, and on assay yielded as follows:—Copper, 23.8 per cent.; gold, trace; silver, nil.

A few pieces were taken here and there from the bottom of the shaft from a softer calcareous slaty ore which appeared to contain a considerable amount of cuprite or red oxide, and on assay gave as follows:—Copper, 31.8 per cent.; gold, trace; silver, nil.

None of these samples showed the presence of arsenic and bismuth, which metals are harmful where copper is concerned.

A small fragment of rock was shown to the writer, which shows a fair amount of paint gold, that is, gold in thin flakes, on a slickensided surface. This was said to have been found in the dump at the shaft.

The amount of work done on the property so far is very small, as it is only a recent discovery, the deepest shaft being 30ft., beyond which the only workings are eight pits and trenches of depths varying from a foot or so up to 5ft. It is not, therefore, possible to say very much about the deposit, more especially as it has no outcrop, and can only be seen where a trench has been cut through the soil to the rock below.

For instance, from No. 1 hole across the apparent line of strike of the lode to No. 4 hole is about 2 chains, but one would not be justified in saying that the lode is here 2 chains wide, because between these spots there is $1\frac{1}{2}$ chains of ground which has not been prospected at all. Before it could be said that the lode was $1\frac{1}{2}$ chains or 2 chains wide it would be necessary to prove it absolutely by trenching or cross-cutting. Similarly, in speaking of the length of the lode, it could not be asserted

at present that there is a lode 72 chains, or nearly a mile long, the total distance between Nos. 6 and 8 pits, because between Nos. 7 and 8 pits there is a distance of 42 chains quite unprospected, and between No. 7 pit and the main shaft there is a distance of 12 chains unprospected.

At present, therefore, all that can be said is that a shaft and eight pits have been sunk in various positions more or less along a general line of strike, and that each of these openings shows copper ore to a greater or less extent, but that more work is required to prove the connection between these occurrences of ore, and to prove whether they are all part of one lode or are on parallel or branch lodes, or whether they form irregular masses arranged along a mineralised zone.

It is also well known that even when a lode formation continues for a considerable distance it does not necessarily follow that ore will be found to exist continuously in the formation, for it may, and usually does, occur in shoots separated by more or less barren formation.

In order, therefore, to gather information which will disclose the true nature and mode of occurrence and the length and width of the deposit or deposits, a good deal of prospecting work remains to be done. A considerable portion of this should consist in opening up the surface by means of open cuttings on the ore wherever known. This is simple and comparatively cheap work, cheaper than underground work, and it will result in proving the size and extent of the ore on the surface, and showing what connection exists between the various places which now show ore, showing whether they form part of one lode and can be worked together, or whether they are on different formations and must be separately followed.

This work will also be on ore, and will have the advantage of producing ore to assist in paying for the work.

Trenching at reasonable distances apart along the line will prove the continuity or otherwise of the lode, and shaft sinking can be proceeded with in accordance with the results obtained.

In the early prospecting stage of a property there is only one rule to be followed, and that is to keep on the ore and follow it wherever it goes.

The shaft should be sunk on the best ore, and should follow that ore down, keeping right on it, following it on the underlie if necessary. The common idea of going away from the lode and sinking a nice vertical shaft to cut it at a depth should be strictly avoided at this stage. There will be ample time for that later on, after the lode has been proved by means of shafts sunk right on it.

To resume briefly, the proper way to prospect the property may be stated as follows :—

Work the ore wherever it shows on the surface by open cutting, which is cheap work and will produce ore, and will also show the relationship between the various occurrences, besides affording a valuable guide for underground development work.

Trench along the supposed line of lode at reasonable distances apart, say, 100ft. This will prove the continuity of the lode formation and of the ore in it. Sink one or more shafts on the best of the ore, following the ore all the time, and have the shafts at a reasonable distance apart, say not more than 200ft., so that later on they can be connected by a drive at any desired level, and will serve purposes of ventilation.

A little crosscutting could be done from the shafts at suitable levels, to prove the width of the formation.

General.—Timber is not very plentiful in the vicinity nor is there a good water supply. Water level appears to be between 100ft. and 200ft. in depth, and the water obtained by sinking is generally saline.

Reliance would probably have to be placed on surface rain water dams, although the average annual rainfall is only about 8in., and a good site for a dam could be obtained close to the mine, if future developments warranted it.

The road between the mine and Mingary railway station is fairly good with the exception of several sandy creeks, which make bad crossings, and the cost of cartage is understood to be 32s. 6d. per ton. Railway freight to Wallaroo is 17s. 5d. per ton, with an additional 1s. per ton for shunting, so that the total cost per ton freight from the mine to the smelter at Wallaroo amounts to £2 10s. 11d. per ton. To this have to be added smelting charges, and the customary smelting deductions for moisture and smelting losses have also to be allowed for.

The following parcels of ore have been despatched and sold, practically all of which have been obtained from the shaft :—

Tons cwt. qrs.	Copper.		Net Value at 20s. per Unit after Deducting Freight and Smelting Charges.		
	Per cent.		£	s.	d.
6 0 2	44.02		198	19	2
6 4 2	37.34		315	5	5
7 3 3	28.65		—		
7 6 2	28.88		146	13	9
6 9 3	40.99		198	8	3
33 5 0	—		859	6	7

The ore is sorted into first grade of about 40 per cent., and second grade of about 28 per cent. and in addition to the above lots sold there was about 6½ tons of second grade ore at Mingary awaiting despatch, and 7 tons at the mine about half of which would be first grade, the remainder second grade.

From what could be seen it appears likely that whatever the developments of the property may be in depth, a matter which can only be disclosed by further prospecting work, a considerable quantity of rich copper ore will probably be obtained from the shallower workings. (9-10-18.)

THE NEW GLENLOTH GOLD MINE, GLENLOTH.

FORMERLY KNOWN AS FABIAN'S No. 3.

(See Record of Mines, p. 314 ; and Mining Reviews 9, 11, 13-28.)

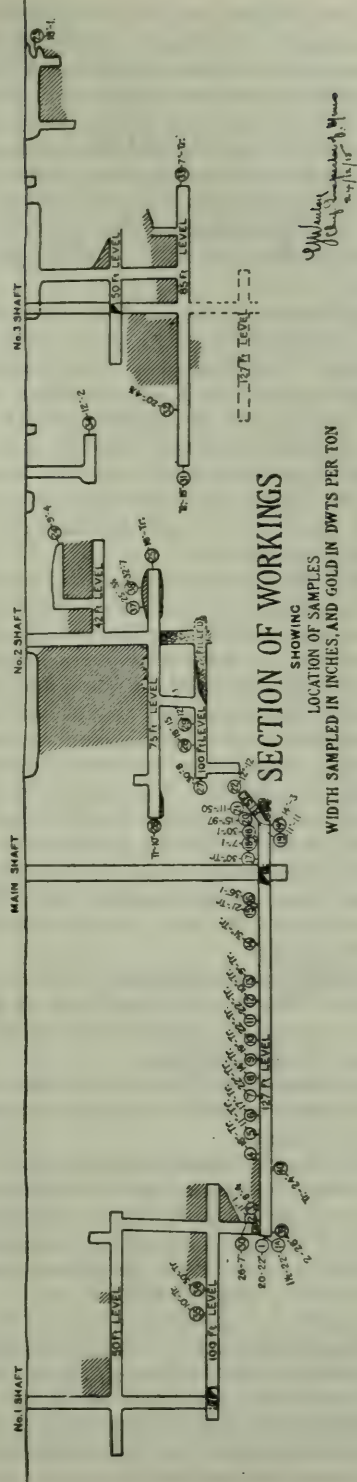
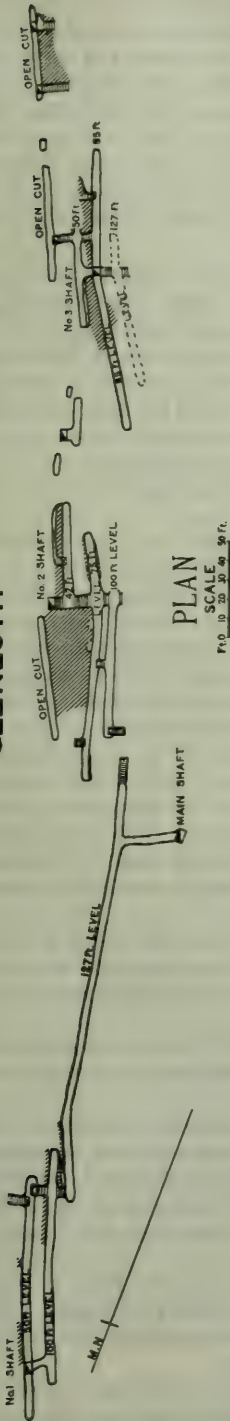
The mine was first discovered by H. Fabian, from whom it was acquired and worked by a company as the New Glenloth Mining and Battery Company. This company ceased operations and the mine was idle for some time, with the exception of a small amount of tributing work, until the present syndicate took it up, under the title of the New Glenloth Gold Mining Syndicate No Liability.

The property consists of one gold lease of 20 acres, No. 1506, situated about one mile N.E. from the Glenloth Well, and three miles from the Government Battery on the W. shore of Lake Harris. The mine is 48 miles by road S.E. from Tarcoola railway station, and 20 miles by road S.W. from Kingoonya railway station, both on the East-West railway.

The country is granite mostly covered with sand and clothed with salt bush, blue bush, and mulga, with a certain amount of spear grass, and forms part of the Wilgena Station, now unstocked. The surface is hilly with outcroppings of granite on the higher ground, the lower ground having a covering of sand in most parts, which renders prospecting rather difficult. Salt water for battery purposes can be obtained readily from the vicinity of the lake, and water is obtained from the Glenloth Well for boiler purposes. A small amount of water is obtained from the mine, but is too saline for boiler use.

There have been many gold leases held and worked in the vicinity, but the company now holds that on which the greater part of the previous mining work has been done, and apparently the workings of this mine are more extensive than any of the other mines on the field.

NEW GLENLOTH GOLD MINE (FABIAN'S NO 3) GLENLOTH



W. H. Fabian
1870-1871

In brief, the lode may be described as a ferruginous quartz formation with decomposed granite, occurring in granite, varying in width from a few inches to several feet, and having a general strike of N. 21° W. with a dip to the W.S.W. of 80°-75°. The natural water level appear to be about 100ft., and the deepest working is the 127ft. level of the main shaft. The lode is continuous, although the width varies considerably; but the gold ore occurs in shoots in the formation, the richer shoots being separated by intervening poorer portions of the lode, rendering necessary a considerable amount of developmental work per ton of ore obtained. The total length of the workings is 740ft., in which distance there are seven shafts, the deepest of which is the main shaft of 135ft., and the greatest length of continuous stoping is 50ft.

Detailed Description of Workings.—About 150ft. from the N. boundary of the lease is situated the No. 1 shaft, vertical, and 100ft. deep, this being the northern extremity of the workings. This shaft is sunk on the hanging wall side of the lode, cutting it at a depth of 50ft., at which point a level has been driven along the course of the lode, N. for 25ft. and S. for 96ft. No work has been done on the lode in the N. end, but S. of the shaft the lode has been stoped for 24ft. in length and for some distance above the level. At 55ft. south of the shaft there is a small stope 5ft. or 6ft. in length. Beyond this a rise has been put up on the lode for about 20ft., but no stoping has been done, and near the S. end of the drive a winze connects with the bottom level.

The 100ft. or bottom level only extends a few feet N. of the shaft, from which access is obtained by means of a crosscut. No work has been done at the N. end, but at the S. end the lode has been stoped for a length of 50ft., the stope, however, not extending to the level above. The winze from the 50ft. level continues on below the 100ft. level for 20ft. or more, and probably connects with the N. end of the N. drive from the main shaft, though as the opening is a very small one and the bottom of the winze is full of loose ground, it cannot actually be seen. A certain amount of stoping has been done from the S. end of the winze to the S. end of the drive.

Nearly due S. from No. 1 shaft, and distant 287ft., is the main shaft, which is vertical and 135ft. in depth, with one level only, driven both ways along the lode at 127ft. down. This is a good shaft, 7ft. x 4ft. in the clear, and timbered in the upper portion, there being a sump below the level from which the water is baled to keep these deeper workings dry. This shaft is sunk in the hanging wall side and has not cut the lode, which at the 127ft. level is reached by means of a crosscut 33ft. in length.

Where the crosscut enters the lode a level has been driven N. for 189ft. At the N. end of this drive, in the back, is a small opening, which, as previously mentioned, appears to connect with the bottom of the winze from the lowest level of the No. 1 shaft workings.

At a point 148ft. N. of the crosscut is the S. end of a stope which extends N. for a distance of 26ft. and is possibly connected with the stope at the S. end of the No. 1 workings.

This is the only stoping done on this level, with the exception of about half a ton of ore which was taken from the bottom of the level under this stope, and included in the last crushing, 20/11/18. S. of the crosscut the level extends for more than 30ft., but the end cannot be seen as a rise is being put up on the lode at the 30ft. mark at an angle of 43°, to connect with a winze from the N. end of the bottom level of No. 2 shaft workings.

Sulphide ore, consisting of iron pyrite, shows in this rise. S. 50° E. of the main shaft, and distant from it 138ft. are the No. 2 shaft workings.

This shaft is vertical to a depth of 23ft., from which point it underlies at an angle of 62° on the dip of the lode to a depth of 100ft.

At 42ft. down a level extends S. for a distance of 50ft., and from the shaft the lode has been stoped for 14ft. south, from which was obtained a parcel of ore which was crushed at the Glenloth battery (21/8/1918).

A small pillar of ground is standing at the end of this stope, and the lode is then stoped to the end of the drive, a distance of 30ft.

North of the shaft there is no drive at this level, the whole of the lode having been stoped out and filled, apparently from the 75ft. level up to the surface, connecting with the open cut which lies N. of the shaft.

At 75ft. down, driving has been done N. and S. of the shaft. The N. drive extends for 90ft., and the load appears to have been stoped from the shaft to 50ft. N.

At 30ft. N. of the shaft a winze 24ft. deep connects with the 100ft. level; 41ft. N. from this winze a rise has been put up for a few feet from the back of the drive and a little stoping has been done at the N. end of the drive, in the bottom. The S. drive extends for 32ft. S. of the shaft, and for the last 25ft. the lode has been stoped above and below the level, for a little distance, furnishing the major portion of the last crushing of 9 tons 13cwts (20/11/1918).

The lower portion of the shaft has been filled in up to the 75ft. level, and access to that portion of the 100ft. level which is open is obtained by means of the winze N. of the shaft. From the bottom of this winze the level extends N. for 35ft., and at the N. end a winze has been sunk, said to be about 20ft. in depth, in which water was standing at the time of inspection. It is this winze to which it is proposed to connect by means of the inclined rise from the main shaft workings. The rest of the 100ft. level S. of the winze was filled and inaccessible.

On the surface an open cut extends from a few feet N. of the shaft, to a distance of 66ft. N. S. 17° E. from the No. 2 shaft and 87ft. distant is a shallow shaft part vertical and part underlie, 40ft. in depth, at the bottom of which the lode has been driven on a few feet N. and about 15ft. S., but no other work has been done. N. and S. of this shaft a little shallow open cutting has been done.

No. 3 shaft and workings lie S. $9\frac{1}{2}^{\circ}$ E. from the last shaft and 86ft. distant from it.

The shaft is vertical to a depth of 85ft., and thence underlies on the dip of the lode for a total depth of 127ft. The first level is at 50ft. where a certain amount of stoping has been done, and this level is also connected to the surface by means of a rise which connects with an open cut on the surface. At 85ft. deep the lode has been driven on N. and S. North of the shaft a stope extends 40ft. in length and apparently to close under the 50ft. level in height. A little stoping is said to have been done in the bottom of this level, north of the shaft. South of the shaft a stope extends 38ft. or more towards the S. end of the drive, and a rise goes up connecting with the rise from the 50ft. level.

Below the 85ft. level there is said to be another at 127ft., but this was not accessible. There is said to be 60ft. of driving N. of the shaft and 20ft. to the S. at this level. At the surface the outcrop of the lode has been open cut for a length of 60ft., the greater portion of the cut lying S. of the shaft.

At a distance of 35ft. S. of the S. end of this cut is another cutting on the lode, about 45ft. in length, from which two underlie shafts have been sunk to shallow depths, and the lode has been stoped out between them for some depth. This is the southern extremity of the mine workings.

The lode, as previously mentioned, is a ferruginous quartz formation, with decomposed granite. The upper portion of the lode dips steeply, but with depth takes a flatter angle. The lode, as will be seen from the assay table, varies from a few inches to 22in. or more. It occurs entirely in granite, and shows a little soft clay on both walls, and is practically continuous throughout the length of the workings, although its gold content varies considerably, occurring in shoots in the formation.

In the accompanying plan and section the stoped areas are indicated by hatching, but in places, owing to inaccessibility, the boundaries of the stoping could not be definitely ascertained.

On the section the assay number of each sample is shown in its proper position; immediately after the number is a figure showing the width of the sample in inches, following which is the gold assay value of the sample, given in dwts.

From the commencement of operations by the Government battery at Glenloth a total of 901½ tons has been crushed from this mine, yielding 1,179ozs. of gold bullion worth £3,955 and equivalent to 87s. per ton of ore crushed.

According to these results the gold as produced from the mine contains a certain amount of silver, reducing its value to £3 7s. per oz.

Previous to this ore had been crushed from the mine, but the tonnage and particulars are not available.

Since the present company began work two small parcels of ore have been crushed at the Government battery. The first, August 21st, 1918, was 41 tons, and yielded a total of 6ozs. of bullion, worth £22 17s. 8d., equivalent to an average total value of 11s. per ton crushed. A result such as this very strongly emphasises the need for careful preliminary examination and sampling to ascertain the value of the lode before the expense of breaking, carting, and crushing it is incurred.

The second crushing of November 20th, 1918, consisted of 9 tons 13cwts., which yielded a total of 14ozs. 18dwts. of gold bullion worth £48 17s. 7d., or an average value of 101s. per ton crushed. About one-third ton of this crushing came from the bottom of the N. drive from the main shaft near its N. end, and the remainder from the No. 2 shaft workings.

Number of Sample.	Width in Inches.	Gold per Ton.		Silver per Ton.	
		Ozs.	Dwts.	Ozs.	Dwts.
1	22	1	0	0	8
1A	22	0	1½	Nil	
2	11	0	1	Nil	
3	8	0	4	Nil	
4	18	Trace		Nil	
5	11	Trace		Nil	
6	17	Trace		Nil	
7	22	Trace		Nil	
8	14	Trace		Nil	
9	19	Trace		Nil	
10	22	Trace		Nil	
11	22	Trace		Nil	
12	10	Trace		Nil	
13	9	Trace		Nil	
14	31	Trace		Nil	
15	21	Trace		Nil	
16	36	0	1	Nil	
17	30	Trace		Nil	
18	30	0	1	Nil	
18A	7	0	1	Nil	
19	11	0	11	0	1½
19A	14	0	3	Nil	
20	15	4	17	2	14
21	11	2	10	2	0
22	12	0	12	1	12
23	18	0	1	Nil	
24	9	0	4	Nil	
25	16	Trace		Nil	
26	10	Trace		Nil	
27	8	1	10	2	6
28	18	0	15	Trace	
29	12	0	3	Nil	
30	7	1	6	0	4
31	18	Trace		Nil	
32	20	0	4½	Nil	
33	7	Trace		Nil	
34	12	0	2	Nil	
35	10	Trace		Nil	
36	30	Trace		Nil	
37	25	0	3½	Nil	
38	32	0	7	Trace	
39	28	0	2	Nil	
40	24	Trace		Nil	

Sampling.—The results of the sampling are set out in the accompanying table, and are also given in position on the plan, from which it can be clearly seen that the gold does not occur uniformly throughout the lode, but in comparatively short shoots.

The best shoot is that which occurs in the vicinity of the rise at the S. end of the S. drive from the main shaft, and appears to extend through to the winze at the N. end of the N. drive on the 100ft. level from the No. 2 shaft, and a little S. of it. The samples taken in the rise were characterised by the presence of a large amount of pyrite.

From the assay plan it would appear that the two places worth investigating are the N. and S. ends of the driving from the main shaft.

It might be advisable to extend the drive a little farther to the N. to ascertain if the lode here contains sufficient gold to be worth working, for possibly the shoot which has been stoped on the 100ft. level of the No. 1 workings, may pitch to the N.

At the S. end it seems that the level might be extended farther S. to see if the shoot extends farther that way, and a quantity of ore should then be available for stoping purposes. A block of ore here 40ft. long and 30ft. high of an average width of 12in., would represent about 100 tons of ore, and the assays indicate that possibly a fair proportion of such a block would be worth crushing.

In estimating the value of ore to be obtained from the results of samples taken across the lode, it must not be forgotten that where the lode is of such a width (as in the present case) that the barren wall rock has to be broken down to afford sufficient working room, the ore will inevitably become diluted to a certain extent with worthless material and will not attain to the value as shown by the sample, the amount by which it falls short, depending on how much waste rock has become mixed with it.

Apart from this portion of the lode there does not appear to be much chance of obtaining any considerable quantity of valuable ore from the old workings, and the proper course to pursue is to break new ground, and to open up the lode in fresh places, so that if the lode thus developed is found to contain sufficient gold, there will be a chance to break sufficient ore to show a profit on the operations.

The mine equipment consists of a vertical boiler, about 10-12 h.p., and a double cylinder geared winch erected at the main vertical shaft, which is also provided with a small head frame.

The shaft is not divided, and buckets are used for hoisting.

The sump at the bottom of the shaft is, approximately, 8ft. by 8ft. by 5ft. and is said to hold for about 10 days before requiring to be baled, indicating that water is making at the rate of 200galls. per day.

It has been previously mentioned that owing to the gold occurring in short shoots, with considerable intervening poor formation, development costs will be high.

Taking the shafts, winzes, rises, crosscuts, and drives of the No. 1, No. 2, No. 3, and main shaft workings, it may be said that, approximately, 4 linear feet of development work has been done for 1 linear foot of stoping length.

Assuming the average cost of all developmental work to be £2 10s. per foot, and taking an average width of lode of 18in. and a stoping height of 100ft. between levels, it will be found that development cost comes to about £1 per ton of ore obtained, or in other words that, approximately, 5dwts. of gold will be required in every ton of ore to pay for development alone.

This is a heavy cost and it will be necessary to plan the work carefully to ensure a maximum of ore disclosed for a minimum of developmental work.

While this developmental work is being done, the old workings could be explored and sampled to see if any ore could be obtained which would help to defray the cost of development, but it would be useless to entertain any hopes of obtaining more than a limited quantity in this manner.

The future prospects of the mine therefore depend upon the opening up of the lode beyond the limits of the old workings, and in this respect probably the most reasonable plan would be to sink deeper, and explore the lode at a greater depth. From the plan, which shows a stoped area on the N. side of the No. 2 shaft, and also the presence of some good assay results in the S. end of the 127ft. level of the main shaft, it appears possible that these areas may form portion of a shoot of gold pitching to the N. which would, if it persists downward, approach nearer the shaft with depth, and could be readily worked from it. The best plan then would be to sink the main shaft, which is already equipped with a boiler and winch, to a further depth of say, 60-100ft., or to the point where the shaft would cut the lode, probably about 70ft., and from it to explore the lode N. and S.

Development to the S. would appear likely to yield the quickest results, as inspection of the plan shows that the lode on the 127ft. level is barren for about 145ft. N. of the shaft.

The 127ft. level from the main shaft could be driven a little farther N. and the lode sampled. If the sampling showed favorable results a winze could be sunk on the lode, and if results were still satisfactory in depth, the question of connecting it for working purposes either with the No. 1 shaft workings, or with the new lift of the main shaft, could be considered. In addition to this work, the possible extension of the lode N. or S. beyond the present workings could be tested. (7-1-19.)

THE LAST CHANCE COPPER MINE.

This property consists of M.C. 10135, situated on the track to the War Loan Copper Mine, and about 6 miles from Boorthanna Railway Station.

It occurs similarly to the War Loan lode, in bleached and decomposed clay slates, the main lode formation having the same strike, S. 30° W., as the country, and being nearly vertical in dip, the slates dipping to the E. at an angle of 75°. The ore here was said to be from 18in. to 24in. in thickness.

There are, however, cross veins or branches about 8in. thick from the main formation, consisting of ironstone with a little quartz and carrying copper as green ore, chalcocite and cuprite, which cut the country slates in strike and dip, the dip being at an angle of 55° to the S.W.

A little chalcopyrite was also noticed.

The main working is an open cut 60ft. long, 20ft. wide, and about 27ft. deep, by means of which the main deposit of ore was worked.

On one side of the cutting a shaft has been sunk partly vertical and partly on the underlie to a total depth of 38ft.

In this shaft two small seams of ore occur, one above the other, the shaft being carried down on the underlie of the upper one. These seams were rather small and did not appear to contain much copper ore at the bottom.

The main lode in the bottom of the cut could not be seen, as broken ground had been filled in, but it was said to be small and poor in depth. The largest formation appears to have been worked out, and the copper at present obtained is coming from the small branch veins. There are traces of copper minerals, however, along the extension of the strike of the main deposit, and some cross trenching should be done to see whether any other workable deposit can be found along the line of strike.—(8-1-19.)

THE WAR LOAN COPPER MINE.

This property comprises two mineral claims, Nos. 10480 and 10481. These claims are about 10 miles in a direct line N.E. from Boorthanna Railway Station, on the Great Northern railway line, and lie in the fork of two small creeks 3 miles S.W. of Mount Fox.



OPEN CUT, WAR LOAN COPPER MINE, BOORTHANNA.



LAST CHANCE COPPER MINE, BOORTHANNA.

The country in which the mine is situated is of hilly nature, forming part of the southern end of the Denison Ranges which run N. and S. on the E. side of the railway line. The hills here are of low rounded form, the surface in many places being covered with loose stones of gibber nature, while in places hills of loose, reddish sand occur. Water is scarce, there being no springs in the immediate vicinity, but soakages can be found in some of the creeks.

The lode occurs near the eastern boundary of a belt of slate about three-quarters of a mile wide, which strikes N.W.-S.E. and is bounded on the eastern and western sides by amphibolite.

The amphibolite is occasionally traversed by irregular veins of quartz, and in places contains small inclusions or phenocrysts of quartz throughout its mass.

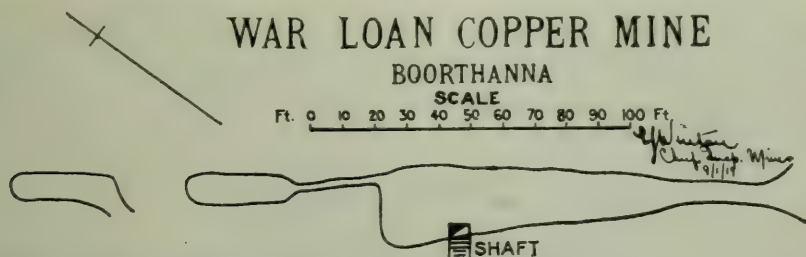
The slate is thin bedded, ferruginous, and silicified, except in proximity to the lode, where it is soft and decomposed, easily worked, and stands well. Bands of quartzite also occur.

The general strike of the country is S. 30°-40° E., and the dip is to the W. at an angle of 55°-60°.

The lode strikes and dips with the country, and consists of a deposit of rich chalcocite or grey ore with a small amount of malachite or green carbonate. It varies in width from 3ft. down to a few inches, and is generally associated with an iron gossan, although some quartz seams show which contain a certain amount of green carbonate not rich enough to send away. Traces only of pyritic ore were seen, and a small amount of carbonate of lime was observed in the slate and occasionally associated with the ore.

The ore is easily broken out and needs but little dressing; two grades being despatched to the smelter—a first grade of about 35 per cent. and a second of about 20 per cent. Fifteen per cent. and under is not considered payable. The great part of the ore has been obtained by means of open cuttings, there being only one shaft, said to be down to a depth of 78ft., but as the lower portion of this had been filled up to within about 40ft. of the surface it could not be inspected.

Information was, however, given by the owners that the lode formation, though still continuing, was small and did not contain sufficient ore to be worth working.



At the S.E. end the lode has been worked by means of an open cut about 120ft. in length, from 3ft. to 12ft. or 14ft. wide, and about 15ft. deep at the N.W. end, the other end opening on to the natural surface. At 20ft. from the N.W. end of the cut a shaft has been sunk, vertically for about 20ft. and then following the lode, dipping to the W.S.W. at an angle of 55°.

A little driving has been done at a depth of about 40ft., following the lode each way, and on the S.E. end the lode is being stoped up under the bottom of the cut, some nice bunches of grey ore showing on the footwall side of the main lode. At the deepest part that the lode can be seen it appears to consist of a small iron gossan formation with but little ore in it.

From the end of this cut, going N.W., some shallow cuttings are said to have disclosed the presence of the lode, but no work has been done on it. About 80ft. N.W. of the main cut another cut has been opened on the lode 3ft. or 4ft. wide

and about 14ft. deep, the lode showing up to 3ft. wide in places. Indications of copper are said to have been seen farther N., but no work has been done beyond this opening.

The lode appears to be decreasing rapidly in size and value as it goes down, and it appears that it is only that part of the lode where a deposit of rich ore has been formed by processes of secondary enrichment that contains sufficient mineral to be worth working.

In explanation of the fact that so many copper shows present this disappointing feature, it may be said that in the case of most copper lodes the upper portion of the lode may become enlarged and enriched by natural processes of enrichment and secondary deposition, and that consequently a lode which originally was of small size and low mineral content may by these natural processes undergo a concentration and enrichment in its upper portion. In working down on the lode, when this enriched zone is passed through, the original unaltered lode is found, possibly too small and low grade in value to be worth working.

In this case the length of lode so far opened up is only 230ft., and there is room for prospecting at each end, where some cross trenching will show whether any continuation of the deposit or any fresh shoots of ore are to be discovered along the line of strike.

It might also be well to sink on the lode at some other point to make sure that the poorness of the lode disclosed by the first shaft was not purely local.

At present the mine may be described as a small deposit of enriched copper ore suitable for a small party of men. (8-1-19.)

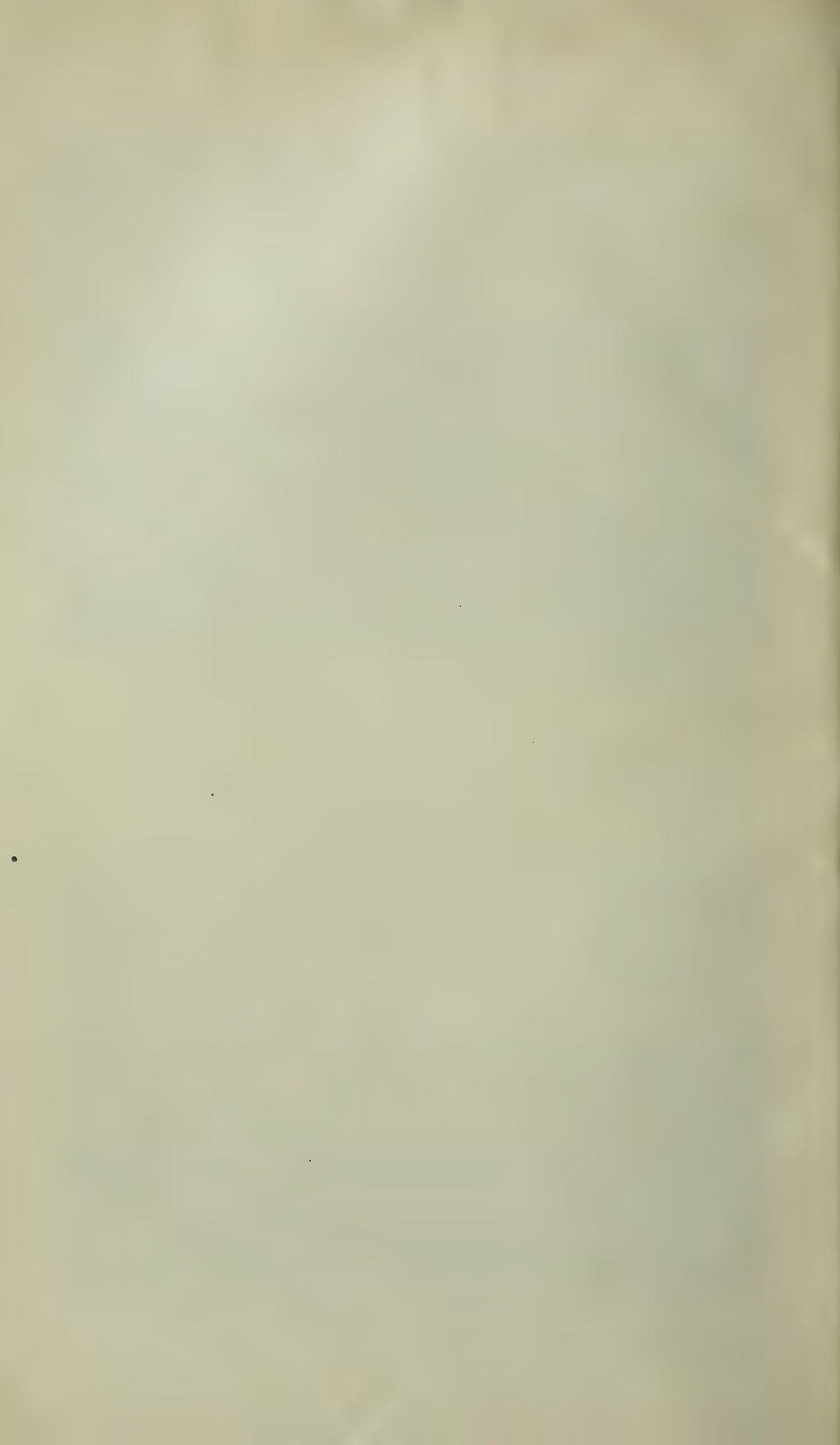


DISTANT VIEW WAR LOAN COPPER MINE, BOORTHANNA.



WARDANG ISLAND, WESTERN COAST. LIMESTONE FLUX QUARRY IN FOREGROUND, AND CALCAREOUS SAND DEPOSIT ON SKY LINE.

To face p. 56,]



REPORTS

BY

The Inspector of Mines (Mr. H. Jones).

THE WHEAL MURRAY GOLD MINE, Forest Range, section No. 4, hundred of Onkaparinga (*vide* also Record of Mines, page 217, for general description of locality). Work has been commenced in the alluvial deposit on the bank of a small water course by an open cut 5ft. to 6ft. deep and 10ft. wide. The deposit—a ferruginous, arenaceous, and argillaceous body from 6ft. to 7ft. thick—is easily worked. A five stamp battery had been installed and everything was running smoothly. (25-10-18). After a run of a few weeks work had to be suspended on account of failure of the water supply.

The workings of the Wallaroo and Moonta Mines have been carefully inspected, and favorably reported upon. The ventilation in both these deep mines is good, and a trial of wet drilling as in use at Moonta is to be made at the Wallaroo Mines.

HICK'S AND HOOPER (Wild Dog, Yelta), *vide* Review No. 28.—In the main underlie shaft at the 15 fathom level the N.E. drive is now in 480ft. and is within 100ft. of the new shaft. From the stope workings up to the present face of the drive, a distance of 180ft., the driving was done through a belt of barren country. The face of the drive for the last 4ft. shows nice bunches and small seams of black copper ore, and it appears possible that one end of another run of ore has been intersected. The two stopes in the old shoot of ore will probably produce another parcel or two of good ore, but both stopes will shortly be through to the surface—The 25 fathom plat. The N.E. drive at this level is now in a total distance of 255ft. The winze and drive were connected at 201ft., and from that point to the face the lode is well defined, showing an average width of 2ft. of high-grade sulphide ore. No stoping has yet been done on this branch of ore at this level. At the 40 fathom level the shaft has been unwatered to the top of the drive, and the work of securing this portion of the shaft and fixing ladders is in progress. (30-12-18.)

MOONTA PROSPECTING SYNDICATE (Tribute Block No. 3.—Workings situated S.W. of Hick's and Hooper's holding, *vide* Review No. 28. There are no surface indications, but a shaft was started on the probable line of lode, and when down a few feet a small formation dipping to the west was struck and sinking was continued on the underlie to a depth of 15 fathoms; at the bottom a drive in the formation has been made N.E. for 42 ft. and is in progress. The prospects of the lower lode, appear fairly encouraging as it contains for a width of 6in. to 9in. streaks and nodules of high grade black copper ore. (23-12-19.)

THE YELTA MINE.—At present only four men are on this mine, and work is confined to the 210ft. level on various small veins of sulphide ore. The mine is safe and in good order. (30-12-18.)

REPORTS ON THE FOLLOWING QUARRIES :—Sheaoak Hill, Crafers Summit, Sim's, Glen Hill West, Glen Hill East, Mitcham Quarry, Fuller and McElligott's, Symon's, Reynella, Pocock's, Anstey's Hill, Brighton Cement, Powell's, Kirkham's Clay Workings, Whiting's Workings, Elliott's Workings, Tom's Phosphate Workings, St. John's Working, St. Kitt's Workings, Green's Workings, Kempel's Workings. In all cases where necessary, instructions have been given to ensure the safety of the workings.

REPORT

BY

The Chief Registrar of Mines (L. C. E. Gee, S.M.)

NOTES ON THE WELFARE WORK IN PROGRESS BY THE BROKEN HILL ASSOCIATED SMELTERS PROPRIETARY, LIMITED, AT PORT PIRIE AND WEEROONA

This company employs from 2,200 to 2,600 men at the Port Pirie Smelting Works, and the following notes, as a result of personal investigation—showing what the company is doing in the way of betterment and welfare work—are published for general information.

Port Pirie Works and Vicinity.—The men working at the furnaces have been given great relief by the installation of fans and hood over the furnace doors whereby the smoke and fumes are carried away. A change house is provided with hot and cold water and crib houses have been erected in all departments. They are provided with cold and hot water laid on, lavatory basins, tables and forms, and are kept in clean and proper condition so that the men can eat their crib in comfort; previously crib was eaten anywhere, generally amongst smoke and dust. There are also special crib houses where men working overtime are provided with meals free of cost.

Stands of cold filtered drinking water have been put up all over the works. Each man has to pump his own drink—this is a device whereby the water cannot be wasted.

On the western outskirts of Port Pirie the company has commenced building cottages for the employees—at present six have been erected (see photo.); these are really up to date little bungalows and have every convenience, a fairly wide passage, four good rooms 12ft. x 14ft. and kitchen. The living room and the kitchen are divided in such a way as to make the meals portion of the house duties as easy as possible. There is also a bath room and pantry and an outside wash-house with copper and washing troughs. The electric light will be installed later.

These houses are really good, bright and comfortable. The moderate rent of 16s. 6d. per week is charged. The company's idea of help to old and well tried employees in this direction will, it is stated, be vigorously prosecuted, but as can be well understood the initial expenses are heavy. The houses are built of cement concrete with tile roofs. The tiles are manufactured at the works.

The boarding and housing of single men is a matter to which attention has been paid, and an old picture palace in the town has been purchased and turned into a boardinghouse for 120 men. The arrangements so far are only of a temporary nature, but the sleeping places are as comfortable as can be arranged; hot and cold baths are provided and every care is taken in respect to cleanliness and sanitary matters. The meals are good and abundant, and the men are charged 22s. 6d. per week for board and lodging.

The children's playground on the Port Pirie Park Lands was brought into being in one day—August 17th, 1918—mainly by the voluntary work of 1,800 of the company's employees. This is a matter of history and has been commented upon and admired throughout the Commonwealth; but it may be further noted that the work of planting and beautifying the rest of the park lands is in hand under careful and skilled direction, and is making good progress.



B.H.A.S. COMPANY'S COTTAGES, PORT PIRIE.



B.H.A.S. COMPANY'S COTTAGES, PORT PIRIE.

The Provident Fund.—A Provident Fund to assist deserving cases of temporary financial embarrassment, whereby a loan is made without interest, has been established. This has been, as is cordially admitted by the employees, a great help and repayments are made in fortnightly instalments.

The Accident Fund and Allowance on Death.—This is governed by a board of nine trustees. One to be elected by each union, except the A.W.U., which can elect two trustees. The company can appoint up to three trustees, who need not be members of the fund. The employees belonging to the fund pay 6d. per week each and the company subsidises this £1 for £1.

Cases of accident are dealt with by the trustees and an allowance of £1 10s. per week is made. This is irrespective of and in addition to any amounts the employees may be entitled to receive from any benefit society they may belong to and payments under the Workmen's Compensation Act. On death by accident, a funeral donation of £15 is at once paid to the widow or representatives and allowances are paid at the following rates. When the deceased has been a member for three months or less, £25. Over three months and not more than six months, £50. Over six months and not more than nine months, £75. Over nine months and not more than 12 months, £100. For 12 months or more, £150.

The Co-operative Store.—This is financed by the company and 5 per cent. interest is charged on the capital advanced. The committee consists of 32 employees. Six nominated by the General Manager and 26 elected by the men by ballot from the various departments. The store is worked upon a basis of 15 per cent. profit to cover interest and working expenses, and the balance-sheet shows that this object has been attained with a small balance to credit. So far the operations of the store are limited to men's apparel, boots and tobacco, and to women's and children's boots.

Attendance Bonus.—This is somewhat on the lines of the American mining companies; but whereas the American reward for continuous service takes the form of a cash bonus, the B.H.A.S. Co. gives leave of absence on full pay. Any employee who, during a year's service has not lost more than 14 shifts, except unavoidable absence through accident, sickness, &c., receives a fortnight's holiday on full pay; this cannot be commuted into wages, but the spell time must be taken and, as described later, the company has provided a holiday resort on the western shore of Spencer's Gulf, about $1\frac{1}{2}$ miles west of Point Lowly, away from the dust, fumes, and smoke of Port Pirie.

WEEROONA.

The shore line of the northern portion of Spencer's Gulf consists mainly of mangrove flats and rough shingle beaches, and there are few good beaches of hard sand. Such a spot has however, been found about 20 miles across the gulf from Port Pirie near Point Lowly. Here there is a fine hard sand beach about half a mile long, and at low water, about a third of a mile wide—a really good children's beach, so to speak. Some small patches of similar beach also occur between this one and Point Lowly. The place has been named Weeroona and selected by the B.H.A.S. Co. as a holiday resort and sanatorium for their employees. It has been appreciated by the men and their families and the experiment bids fair to have a very successful issue. The trip across from Port Pirie by motor boat or tug takes on an average two and a half hours. Visitors are at present accommodated in 12ft. x 14ft. tents which are furnished and provided with everything required except linen. Visitors must bring their own sheets. A large dining hall has been erected and here at small tables, so that visitors can form their own parties, meals are obtained;

the cuisine is good and the charges made by the company, as per the following statement, cover everything :—

<i>Per week—</i>		£	s.	d.
Adults (all over 16 years)	.....	0	18	6
Children (10 years to 16 years)	.....	0	15	0
Children (3 years to 10 years)	.....	0	10	0
Children (under 3 years)	.....	Free.		
 <i>Per day—</i>				
Adults	.....	0	3	0
Children (10 years to 16 years)	.....	0	2	3
Children (3 years to 10 years)	.....	0	1	6
Single meals	.....	0	1	6
Afternoon tea	.....	0	0	9

The place has only been in existence since December, and visitors have been coming and going all the time. Arrangements are made whereby the periods of leave of absence fit in with the accommodation. Just after Christmas 300 persons were there and at the beginning of February 150. Boats run for day trips on Wednesdays and Sundays, the return fare being 3s., but for employees taking their holidays the passage is free.

Visitors form their own committee for holiday matters, Mr. Glasson is the company's representative in regard to the visitors, and Mr. Lewis is in charge of a construction gang of 50 of the company's men hard at work making a permanent sea-side resort of the place. A water tower has been erected and water laid on to stand pipes at convenient places. This water has to be barged across the gulf from Port Pirie. A powerhouse has been built and the electric light is to be installed throughout. An open air picture show has been established, and a large pavilion, which was formerly a dancing hall at Paramatta, New South Wales, has been purchased and will be erected near the beach. A wharf to provide easy landing is to be built.

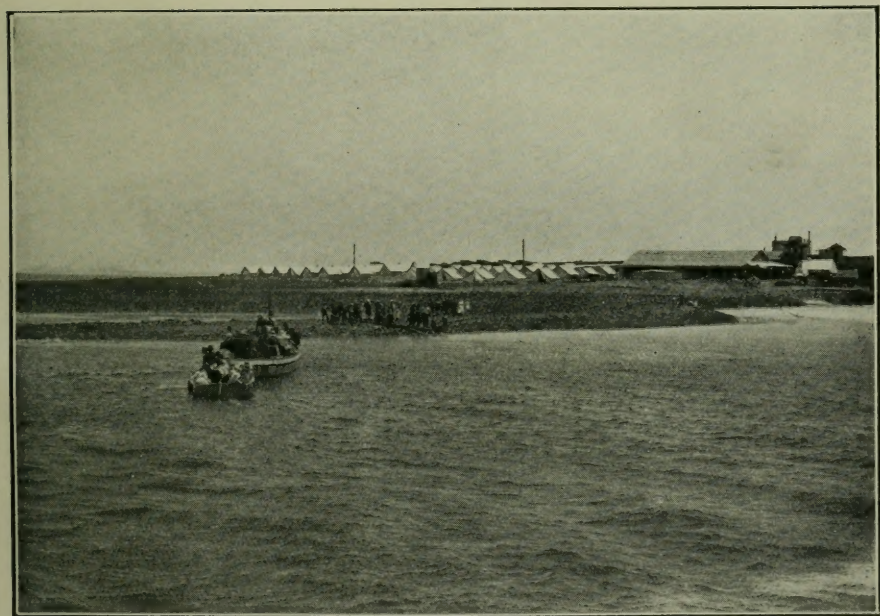
The sanitary arrangements are good and rubbish, &c., is taken to an incinerating plant and burnt.

Three hospital tents are always in readiness in case of illness and a trained nurse is in attendance.





WEEROONA, NEAR POINT LOWLY, SPENCER'S GULF.
LANDING CARGO.



WEEROONA, NEAR POINT LOWLY, SPENCER'S GULF.
LANDING PASSENGERS.

